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Bacteriology in its Relationship to the Oral and Nasal Cavities.*

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I.

The purpose of this article is to treat briefly of certain of the more important pathogenic micro-organisms, most of which are found in the mouth and for all of which the mouth and nose may be the port of entry into the body.

The mouth, especially by virtue of the moisture and pabulum always present, affords these micro-organisms not only an abode, but an excellent breeding place. With each inspiration through the mouth micro-organisms and spores are deposited on the mucous membrane of this cavity, and great numbers are introduced with food and drink, and by contact with drinking and eating utensils, tooth brushes, toothpicks, postage stamps, envelopes, and dental and surgical instruments, etc. Micro-organisms may be carried to the mouth and its adnexa by the action of the ciliated epithelium in the respiratory tract, by coughing, vomiting, hiccough and by the blood and lymph.

*For the drawings in this article I am indebted to Dr. Francis O'vary.

Robert Koch, in 1876, marked the beginning of modern bacteriology by discovering the causal agent of anthrax, which is probably the best-known and longest studied of all the diseases caused by bacteria.

Bacillus Anthracis.

The infection of man by the Anthrax Bacillus (Fig. 1) usually obtains through some break in the skin, in those who have handled the flesh or skins of animals dying of anthrax. Inoculation of the digestive tract by the ingestion of meat obtained from animals suffering from anthrax, is rare. The infection appears to be possible through the respiratory tract, from dust containing spores of the Bacillus anthracis.

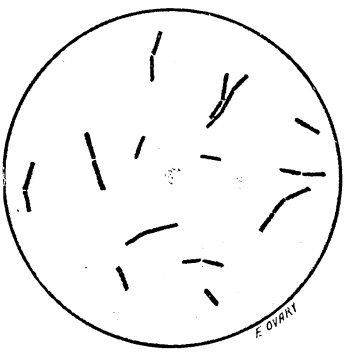


Fig. 1.

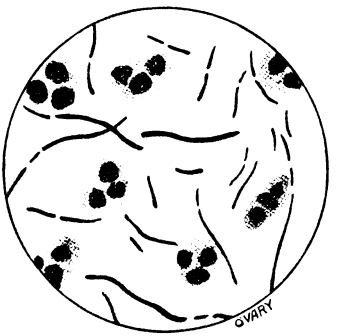


Fig. 2.

Fig. 1. Bacillus Anthracis and Erythrocytes from the Blood of a Guinea Pig, Infected by this Bacillus. X 900.

Fig. 2. Bacillus Oedematis Maligni and Leucocytes from the Subcutaneous Tissue of a Guinea Pig Dying from Septicemia Produced by this Bacillus. X 1000.

Anaërobic Micro-organisms of Gangrenous Suppurations.

Bacillus Oedematis.

The Bacillus Oedematis Maligni (Bacillus Septicus) (Fig. 2), is one of the oldest known anaërobic micro-organisms. Pasteur (1877) fixed its morphology and biology and described an acute experimental septicemia resulting from the subcutaneous introduction of this micro-organism into small laboratory animals. Chauveau and Arloing have shown that it is the agent of a fulminating gaseous gangrene in man, and since Koch's work (1881) the name malignant edema has been given this affection.

Within the last few years Veillon and his pupils have given an impetus to the heretofore neglected study of the anaërobic micro-organisms, and as a result there has been discovered in gangrenous lesions a rich flora of these micro-organisms, among which the following principal species are of interest to the dentist and oral surgeon.

Bacillus Perfringens.

Under the name of Bacillus Perfringens (Fig. 3), Veillon and Zuber (1898) have described an anaërobic micro-organism discovered in gangrenous lesions, which seems to be widely scattered, and has been found in the blood of those suffering from rheumatism, in the myocardium of two patients dying of acute articular rheumatism, in gangrenous suppurations (appendicitis), urinous abscesses, gaseous gangrene, chronic ureteritis, ocular affections, in the putrefying cadaver and in the intestinal tract. This micro-organism is identical with the

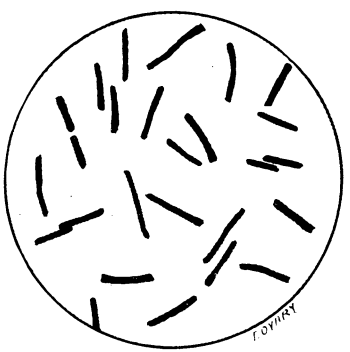


Fig. 3.

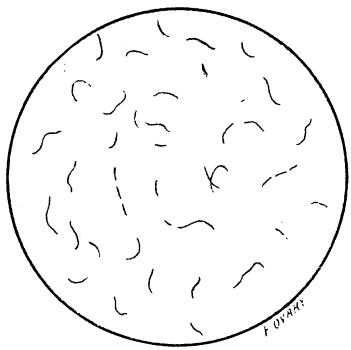


Fig. 4.

Fig. 3. Bacillus Perfringens. (Modified from Besson.) X 1000.
Fig. 4. Bacillus Ramosus. (Veillon and Zuber.)

bacillus described by Achalme (1891) in acute articular rheumatism, and also with the Bacillus aërogenes capsulatus (Welch) found in the organs of a cadaver and the Bacillus phelgmonis emphysematosae isolated by Fränkel in the pus from an abscess.

Bacillus of Ghon and Sachs.

Ghon and Sachs have obtained from the liver of a patient with gaseous gangrene a bacillus resembling the Bacillus perfringens. It is not so thick and at times appears curved and mobile.

Bacillus Pseudo-Oedematis.

The Bacillus Pseudo-Oedematis has been found in the soil (Liborius), in the excrement of animals (San Felice), and appears identical with the Proteus hominis capsulatus described in a case of septicemia in man (Bordoni-Uffreduzzi).

Bacillus Ramosus.

The Bacillus Ramosus (Fig. 4)—identical with a bacillus called Bacillus poeciloides and a bacillus separately described by Lotti and Grigoroff as found by them in cases of appendicitis—exists normally in

the human intestine, but has been found by Veillon and Zuber in the pus from gangrenous abscesses (otitis, appendicitis, etc.) and by Monnier in dental caries.

Bacillus Serpens.

The Bacillus Serpens (Fig. 5) has been observed in the pus from a mastoid abscess (Veillon and Zuber), and in pulmonary gangrene (Rist and Guillemot). It is identical with the Bacillus radiiformis.

Bacillus Tethoides.

The Bacillus Tethoides (Fig. 6), described by Veillon and Zuber under the name of Bacillus fundu-liformis, has been found in the vagina and pus of bartholinitis (Hallé), in pulmonary gangrene and the pus from a mastoid abscess (Rist and Guillemot).

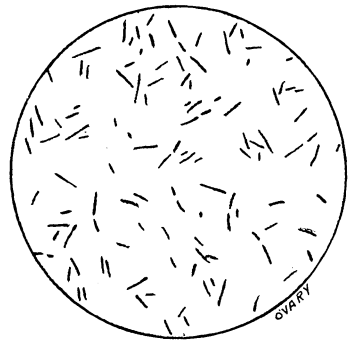


Fig 5.

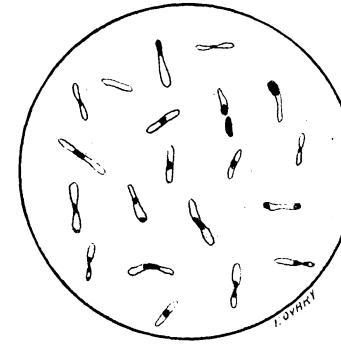


Fig. 6.

Fig. 5. Bacillus Serpens (Bacillus Radiiformis). (Modified from Rist.)
Fig. 6. Bacillus Tethoides. (Modified from Besson.)

Bacillus Fragilis.

The Bacillus Fragilis (Fig. 7), which has been isolated in the pus from a case of appendicitis (Veillon and Zuber), has been found also in the pus of gangrenous appendicitis (Veillon, Zuber, Grigoroff), in periurethral infections (Cottet, Jungano), in pulmonary gangrene (Guillemot), and in dental caries (Monnier).

Bacillus Fusiformis.

The Bacillus Fusiformis (Fig. 8) was discovered by Plaut (1894) and by Bernheim and Vincent (1896) in Plaut-Vincent angina and Vincent, because he had found this micro-organism in nosocomial gangrene, believed it to be the primary cause of that condition.

Willaume, Percy, Richerand, Dupuytren and others had succeeded in producing lesions of nosocomial gangrene, infecting healthy men with material taken from lesions of this disease; and Vincent confirmed these observations by repeating this experiment upon some Arabs and upon himself.

The Bacillus fusiformis is found abundantly within the pseudo-membranes of gangraena nosocomialis, but is never found in the blood or lymph nodes, and does not invade the tissues of the body. In the lesions it may be alone, but is usually associated with other micro-organisms, such as the Staphylococcus pyogenes, Streptococcus pyogenes, Proteus vulgaris, Bacillus pyocyaneus, Bacillus coli, and the Bacillus of Friedländer. The micro-organism most frequently associated with this bacillus (40 times in 47 cases examined) is a spirillum (Fig. 8) (Spirochaeta of Vincent or the Spirochaeta gangraenae nosocomialis). Vincent found the Bacillus fusiformis not only in the Plaut-Vincent

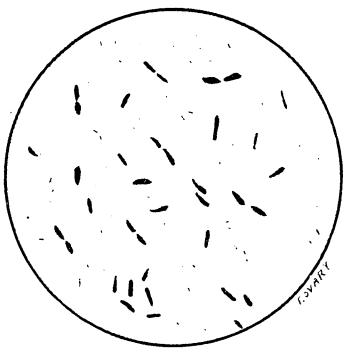


Fig. 7.

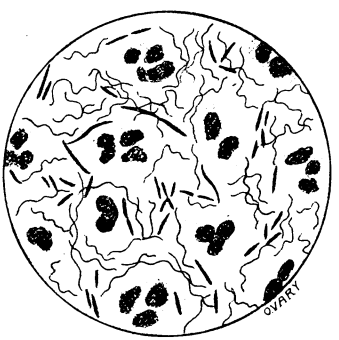


Fig. 8.

Fig. 7. Bacillus Fragilis. (Modified from Besson.) X 1000.
Fig. 8. Bacillus Fusiformis, Spirochaeta of Vincent or Spirochaeta Gangraena Nosocomialis and Leucocytes. X 1000.

angina, but also in some diphtheroid and ulcero-membranous stomatitides. In the diphtheroid stomatitis, the Bacillus fusiformis of Vincent is said to be accompanied by different saprophytic micro-organisms, but in the ulcero-membranous form a spirillum is associated with it. The researches of Vincent have been confirmed by Bertheim, Raoult and Thiry, Abel, Panoff and Letulle. The Bacillus fusiformis has been discovered in appendicitis by Veillon and Zuber, and later by Grigoroff and Perrone, in gangrenous laryngitis by Bernheim and Pospischill, in fetid bronchitis by Silberschmidt, and in noma by Freimuth and Petruschky, Passini and Leiner, and it is similar to the Bacillus hastilis, found by Zeitz in the crypts of the tonsils. Mühlens, von Ellermann, Repaci, Tunnicliff and Weaver have found the Bacillus fusiformis in the healthy mouth and in tartar. The Bacillus fusiformis, together with coarser spirochaetae, has been found next to the teeth, especially the molar teeth, of healthy persons under the gum margin, in carious teeth, in the lesions of ulcerated and mercurial stomatitis, in gangrenous chancres, in moist diphtheritic mucous patches and in gangrenous ulcers of the leg. The

administration of mercury seems to favor the development in the mouth of these micro-organisms, viz., the Vincent bacilli and accompanying spirochaetae, while salvarsan hinders it. The Bacillus fusiformis is immobile and fusiform. Smears made from the false membranes of the angina and colored with fuchsin or Nicolle's gentian violet show the bacilli to be 5 to 12 micra long, .6 to .8 of a micron thick, rectilinear, at times slightly curved and even in the form of an elongated S. This bacillus has thin rounded ends, which give it its fusiform characteristic, and which thereby causes it to differ from the form of the Bacillus oedematis maligni (Fig. 2), which has sharply cut ends. Many of these micro-organisms appear in pairs, and in mild cases 20 to 30 of them are found in a preparation; in severe cases they vary in number with the gravity of the case, and are usually associated with other micro-organisms. In wounds which have been treated with antiseptics numerous involution forms are found, viz., vacuolated bacilli with spindle ends and cut-out edges, and elongated forms with well-colored constrictions and uncolored swellings. The Bacillus of Vincent is easily colored by basic aniline dyes and particularly by fuchsin and gentian violet. Those which have been colored by methylene blue fix the coloring matter irregularly and present irregular shaped vacuoles, which are evidently not spores, as they do not stain like spores. Different authors give numerous diverging opinions upon the several characteristics of this Bacillus fusiformis. Most investigators consider it immobile (Vincent, von Ellermann, Mühlens, Weaver and Tunnicliff); Letulle says it moves in the saliva; Vespremy that it has cilia, and Plaut that it has numerous fine cilia forming a halo around it, resembling a layer of cotton. Contrary to most bacteriologists, Plaut states that the Bacillus of Vincent is stained by Gram's method and he is supported in this by Jungano and Distaso. The variations in the morphology of the Bacillus of Vincent convinces von Ellermann that there are several species of it (three types). Silberschmidt, however, considers the bacillus as only a growing form of certain spirochaetae.

According to B. Lipschütz, the relative number of these fusiform bacilli to spirochaetae varies greatly in a Plaut-Vincent angina, nosocomial gangrene, etc., and the relationship between these two micro-organisms is symbiotic and not genetic, because when the attempt is made to cultivate them at the same time upon the same culture medium, colonies of the Bacillus fusiformis appear in two or three days, whereas the colonies of the spirochaetae appear several days later, and, further, the Bacillus fusiformis is avirulent to animals, and in lesions of nosocomial gangrene this bacillus is found only upon the surface of the lesion, indicating thereby that it is saprophytic and non-parasitic. Therefore the

supposition is advanced that the Spirochaeta gangraenae nosocomialis and Spirochaeta of Vincent (the two being thought by some as identical) are the causal agents of these several gangrenous lesions, and that the Bacillus fusiformis plays but a commensal part, resembling the rôle which the Streptococcus pyogenes plays in some epidemics of variola.

Spirillum Nigrum.

The Spirillum Nigrum (Fig. 9) has been found in the pus of appendicitis (Veillon and Zuber), in pulmonary gangrene (Guillemot), and in some cases of infections of the urinary apparatus (Cottet and Jungano), and in the mouth of nursing children (Micrococcus gazogenes alcalescens of Lewkowicz).

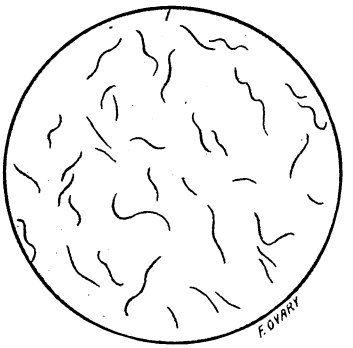


Fig. 9.



Fiy. 10.

Fig. 9. Spirillum Nigrum. (Modified from Besson.) X 1000.
Fig. 10. Bacillus Septicus Aërobius. (Legros.)

Micrococcus Foetidus.

The Micrococcus Foetidus has been seen in the pus from gangrenous processes (Veillon), in suppurations from the ear (Rist), in pulmonary gangrene (Guillemot and Cottet), in puerperal infection (Jeannin), and in the vagina and pus from bartholinitis (Hallé).

Herter states that "it is probably safe to assume that in the mouth the free presence of oxygen constantly acts as a deterrent to anaërobic growth. In spite of this, however, anaërobic life is possible, and the indications are accumulating which point to the important part played by anaërobes in setting up pathological states in the mouth. Caries of the teeth, which was formerly referred to aërobic bacterial action, seems clearly the result of the invasive action of the anaërobes on the tooth pulp. In certain derangements of digestion I have noticed that butyric acid fermentation or putrefaction takes place with great rapidity in the food particles that have lodged between the teeth, especially if carbohydrate food has been taken. It must be admitted that proof is wanting

that butyric acid formation in the mouth is always due to anaërobes. The growth of anaërobes in the mouth is favored by want of cleanliness there, since the accumulation of food masses encourages anaërobic conditions beneath the surface. Probably the intelligent use of the tooth brush is a most potent means of discouraging anaërobic growth in the mouth. In removing decomposing food masses, one not merely admits air to the anaërobes, but also removes many aërobes, which, through symbiotic action, facilitate the multiplication of the former." Pasteur pointed out the fact that anaërobic micro-organisms would grow in a medium containing oxygen, if aërobes were present, as the latter removed the oxygen from the medium.

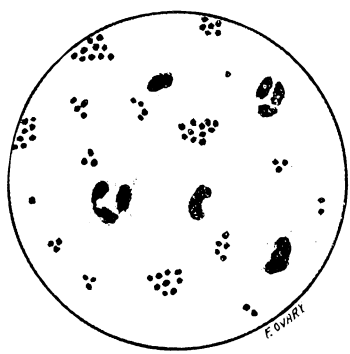


Fig. 11.

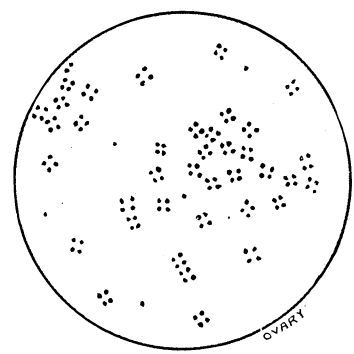


Fig. 12.

Fig. 11. Staphylococcus Pyogenes and Leucocytes. X 1000.
Fig. 12. Micrococcus Tetragenus. X 900.

An Aërobic Micro-organism of Gangrenous Suppuration.

Legros has observed two cases of gaseous gangrene in man caused by an aërobic bacillus, which he described under the name of Bacillus Septicus Aërobius (Fig. 10). Mauté has observed the same micro-organism associated with the Streptococcus and Staphylococcus in a case of puerperal fever and appendicitis.

Staphylococcus Pyogenes.

The three Staphylococci Pyogenes (Fig. 11) differ only in the color of their cultures, and accordingly are separately described as Aureus, Albus and Citreus. Their biological properties are the same. According to Rodet and Courmont there are three variants of the same species, and we shall therefore take the Staphylococcus Pyogenes Aureus (Pasteur), which was the first discovered, as the type. This micro-organism is widely distributed in nature, being found in the air, in certain waters, on the surface of the skin, on mucous membranes, in the ali-

mentary tract and under the nails. It is constantly met with in the buccal cavity, and is probably the same micro-organism as that described by Biondi under the name of the Micrococcus salivarius pyogenes aureus. It is also frequently found in pus, particularly in furuncles and osteomyelitis, in abscesses and in the exudate of pleurisy, pericarditis, peritonitis and ulcerative endocarditis. It causes certain forms of rhinitis, pharyngitis, bronchitis and broncho-pneumonia. At times it passes into the blood and produces pyemia. It is frequently associated with the tubercle bacillus in inflammations of the pleura or meninges. It complicates trichophytinous diseases; is often associated with the Pneumococcus in pneumonia and the Klebs-Löffler bacillus in diphtheria. It favors the development of the Bacillus of Vincent (Vincent), the Bacillus of influenza (Grassberger) and spores in the Bacillus oedematis maligni (Besson).

Welch has discovered what he thinks is a feebly pathogenic form of the Staphylococcus pyogenes albus, the Staphylococcus epidermidis albus, which he says may cause suppuration and which appears to be present habitually on the surface of the skin and in the deeper part of its malpighian layer. It is thought that this micro-organism in the epidermis may develop under certain conditions, viz., when cat-gut sutures are tightly drawn, and thus cause a skin abscess.

Micrococcus Tetragenus.

The Micrococcus Tetragenus (Fig. 12) was first pointed out in the pus from a cavity in the lung. It is a saprophytic micro-organism disseminated in the air and on the surface of the skin; is met with in the saliva, stomach and nasal mucus of healthy subjects; may become pathogenic and is frequently associated with the tubercle bacillus in pulmonary tuberculosis. It causes pharyngitis, different forms of suppuration (empyema, adenitis, meningitis, furuncles, dental abscess and sometimes septicemia).

The Streptococcus.

Pasteur and Doléris discovered the Streptococcus (Fig. 13) in the blood of patients having puerperal fever. This micro-organism causes many forms of suppuration; puerperal fever, phlebitis, purulent surgical infections, certain forms of broncho-pneumonia, empyema, peritonitis, meningitis, endocarditis, salpingitis, otitis, dermatitis, osteomyelitis and erysipelas (Fehleisen). In all forms of pharyngitis, of whatever nature, the Streptococcus is met with either as the dominant micro-organism or as an associate (Prudden, Raskin, Lemoine, Weaver, Cumpston). That the Streptococcus is not the causal agent of scarlatina is generally admitted to-day, yet it is almost constantly found in this disease and causes a great number of complications (Combemale and Lamy, Babès Raskin, Kurth), and may be considered as the micro-organism of secondary in-

fection. Hektoen has found it 12 times in 100 in the blood of scarlatina patients, and it is almost always encountered in their throat (Weaver). The Streptococcus is still more to be dreaded when it associates itself with certain pathogenic micro-organisms and enters the scene of the disease as a secondary infection because it appears to exalt the virulence of the micro-organisms to which it is added. It has been found associated with the Bacillus of influenza (Vaillard and Vincent, Ribbert, Weichselbaum, Chantemesse and Widal), of typhoid fever (Vincent), of diphtheria (Löffler, von Behring, Roux and Martin), and with the Pneumococcus, the

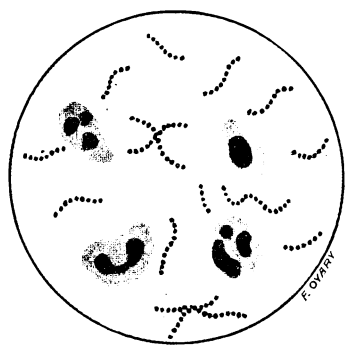


Fig. 13. Streptococcus and Leucocytes. X 1000.

Bacillus tuberculosis and the Bacillus fusiformis of Vincent. It is met with in the healthy individual on the surface of the skin, in the mouth, nose, alimentary tract and rarely in the vagina. It is found in the air, soil and well-water, but seems to lose its virulence very rapidly outside of the body. The multiplicity of morbid processes caused by the Streptococcus and its presence in the healthy human body as a saprophytic micro-organism have attracted for a long time the attention of bacteriologists, and some are inclined to admit the existence of at least two species: the Streptococcus pyogenes of Rosenbach and the Streptococcus erysipelatis of Fehleisen. The morphology of the micro-organism affords arguments in favor of the existence of several types, as a Streptococcus tenuis, brevis and longus can be differentiated. Schottmüller, basing his classification of streptococci upon the different biological manifestations upon human blood agar, describes the following types: (1) Streptococcus longus pyogenes, or erysipelatos; (2) Streptococcus mitior, or viridans; (3) Streptococcus mucosus. Another school of bacteriologists, under the leadership of Marmorek and Aronson, have returned to the unicist theory, that the Streptococcus is only a single species, but is able to cause different morbid conditions,

Accordingly, the saprophytic Streptococcus is not to be differentiated from the pathogenic Streptococcus, and in the healthy human body, under the influence of certain extraneous causes, as traumatism, cold, or the association with other micro-organisms, it may become pathogenic. It seems, therefore, to be less confusing to admit with most bacteriologists that there are for the Streptococcus, as for the Spirillum cholerae, several strains (Denys, Tavel, Moser, Paltauf). It is extremely difficult to single these out. The number of strains of the Streptococcus is still one of the most controverted questions in bacteriology. Petruschky has shown that the same Streptococcus can cause indifferently an erysipelas, an abscess, or septicemia in a man or animal.

McFarland, citing the experiments of Welch, Robb and Ghriskey, upon hand disinfection, says: "These observers have shown that no matter how rigid the disinfection of the patient's skin, the cleansing of the operator's hands the sterilization of the instruments and the precautions exercised, a certain number of wounds in which sutures are employed will always suppurate, the cause of the suppuration being the skin cocci, all of which it is impossible to remove. We thus carry infectious organisms constantly with us upon our skins, and so pave the way for suppuration in wounds. That all wounds do not suppurate probably depends largely upon the local and general immunity of the individual rather than upon the absence of organisms from the wounds."



The Physiological and Pathological Resorption of Tooth Roots.

By Rodrigues Ottolengui, M.D.S., D.D.S., LL.D., New York.

Read before the American Society of Orthodontists at Chicago, July, 1913.

Late in the spring of 1908 a girl of eleven was placed in my care for the correction of malocclusion. The jaws were extremely small, narrow, and the upper arch marked V-shaped. The upper temporary laterals had been prematurely lost, with the result that the first bicuspids were in close proximity to the lateral incisors. The case belonged to Class I of the Angle classification. The routine of slowly widening the arches, and recovering the spaces needed for the cuspids was undertaken, but was necessarily carried on with extreme caution because of the ease with which the teeth could be moved, or rather tipped. I could recount the many difficulties met with in this case, and I am sure they would be interesting, as this is one of the records of failure for which the president of last year made a plea. But as the immortal Kipling has said "that is another story."

The story which I bring you to-day is of far greater importance than the mere history of a failure.

Treatment was carried on with short periods of rest until early in June of 1910, actual treatment exclusive of retention having covered about twelve months. Retainers were placed, and the case dismissed until the autumn. Early in October the patient returned for resumption of her treatment, and as there was still no signs of the eruption of the cuspids, though room had been made for both of them, the girl was sent to Dr. Schamberg for radiographic investigation, and here beginneth the real narrative. Dr. Schamberg called me up on the telephone and

said: "The cuspids are both present, but I have sad news for you. The roots of the incisors are being resorbed." I was somewhat stunned, and I think that those of you who have never had a similar experience will share my feelings when you see the radiographs.

Fig. 1* is from the left side, and shows the cuspid pointing between the lateral and central, with a typical resorption of the lateral root, and by typical I mean as compared with similar resorption of a temporary



Fig. 1 (Schamberg).

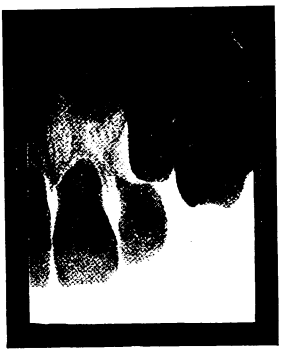


Fig. 2 (Schamberg).



Fig. 3 (Schamberg).

tooth where we see it in connection with an almost erupted successor. Or, in other words, were this permanent lateral a temporary cuspid, we would expect the resorption of the tooth root to appear as it does in this picture. The permanent central, however, is somewhat different, and in the absence of other pictures we would hesitate to decide whether this root had been resorbed, or whether it had never been fully formed.

Fig. 2 shows us the right side. Here we find the cuspid erupting between the lateral and the bicuspid, and this leaves us more than before, in doubt as to whether the shortness of the central root is due to resorption, or to lack of development.

In Fig. 3 we see the two central incisors, and the roots appear so short that it is difficult to believe that they never have been any longer. I could not doubt the fact that I was in the presence of a condition new to me, and so far as I knew, heretofore unreported in the literature. I had seen radiographs of cases where erupting third molars had caused resorption of the distal roots of the second molars, and by analogy I could comprehend the resorption of these lateral roots, and even of the

*I am indebted to Drs. M. I. Schamberg of New York, Sidney Lange of Cincinnati, and F. T. Van Woert of Brooklyn for radiographs. The name under each illustration will indicate the maker of the original radiographs.—R. Ottolengui.

root of the left central, but the resorption of the root of the right central was, and I may add, still is, a mystery to me.

It may be of interest to relate that during that winter I sent these radiographs to a number of radiographers, and received quite conflicting views. The patient's regular dentist declared that he did not think the pictures showed conclusively that the roots were resorbed. He pointed out that the cuspids might be sufficiently lingual or labial of the other teeth to erupt without causing traumatic injuries, and that these four incisors might eventually develop greater length of root. At least one

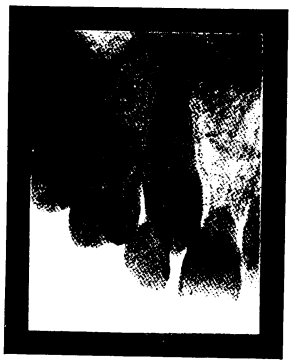


Fig. 4 (Ottolengui).



Fig. 5 (Ottolengui).

radiographer advanced the same view as a possibility, and though I did not believe it, I felt obliged to give the child the benefit of the doubt. I did not care, however, to risk any further stress upon these teeth, and so treatment was delayed awaiting the pointing of one or both cuspids.

In September, 1912, the patient reported for examination, the left cuspid pointing through the labial gum, high up, and in slight torsion.

Fig. 4 shows the condition on the left side at that time. The lateral root has entirely disappeared, and though the central root does not appear to have diminished in size, the direction and close proximity of the oncoming cuspid was a menace to the central, and consequently the permanent lateral was extracted, and orthodontic interference immediately inaugurated. I have the extracted lateral, and it may interest you to examine it and to note how exactly like a shed deciduous tooth it appears.

Fig. 5 shows the right side at the same period. The lateral root shows progression of the resorption, while the central does not appear much altered. Unlike the left cuspid, this tooth will evidently point lingually. This is a point of interest, because here we have a case in which one cuspid erupts in a path slightly labial of normal, and the other slightly lingual of normal, and yet we find a destruction of the

tooth ahead of it in both instances. Nor does the fact that the right cuspid lies lingual of normal seem to have saved the root of the central incisor on that side, which has resorbed despite of the fact that a tooth intervenes on each side of it, between its own root and the oncoming cuspids.

During the past winter the cuspid on the left side was moved away from the central incisor and down into position. Fig. 6 shows the condition on March 19, 1913. The shadows of the cuspid and bicuspid



Fig. 6 (Ottolengui).



Fig. 7 (Ottolengui).

overlap so that the picture is slightly confusing, but shows definitely that the cuspid has been moved clear of the central. The cuspid on the right side has not as yet pointed. Fig. 7 shows the condition on the right side at the same date. The roots appear somewhat longer than in the previous pictures, but this is undoubtedly due to distortion.

Resorptions Differentiated.

In the title of my paper I mention "physiological" and "pathological" resorption of tooth roots. By physiological resorption I mean that resorption of a root which occurs as a part of the normal routine, as when the roots of deciduous teeth resorb to accommodate the erupting successor. There is one marked clinical fact to be noted in regard to physiological resorption, and that is that the pulp of the deciduous tooth, though shortened with the root, remains alive.

By pathological resorption I mean a resorption inaugurated by some outside interference with the normal routine. There are several distinct kinds of pathological resorption, which are accompanied by clinical aspects, which are fairly constant when studied with the X-ray.

Let me pause here to make a statement. I am not counting myself as an histologist in this discussion. Indeed, I admit freely that I do not really comprehend the histology of these conditions, but, then, I may add with all deference, that judging by what they have written, the histologists themselves are not absolutely sure of their ground. In the main, these problems have heretofore been studied in the laboratory and with the microscope. I am bringing you such evidence as I have been able to collect with the aid of the X-ray and radiographers, and as some of



Fig. 8 (Schamberg).



Fig. 9 (Schamberg).

this evidence seems to be in conflict with the expressed views of the histologists, and as I am recording the history of an unusual and heretofore unrecorded condition, I am hoping that the histologists will once more take up this study, and perhaps by combined effort bring some order out of the present chaos.

Asking your pardon for this digression, which seemed necessary, let us return to the subject.

Pathological Resorption.

A common variety of pathological resorption is that found in connection with infections.

Fig. 8 shows resorption of the ends of the roots of a molar. This is pathological resorption due to alveolar abscess, the pulp dying prior to the beginning of the resorption.

Fig. 9 is a picture for which I am deeply grateful to Dr. Schamberg, who supplied me with this and the previous radiograph. This particular picture is of great interest because here we have extensive resorption of three roots, undoubtedly pathological in character, the resorption having been caused by a tumor, which has destroyed the roots and the pulps of a lower central, lateral, and cuspid. This picture serves well as a basis

of comparison when considering the case already presented, and others to be shown, in which the roots of several teeth have been resorbed. In this tumor case we know that we are in the presence of a pathological condition, whereas in the others we are in doubt, and I may call your special attention to certain facts. In the doubtful cases, including the first one presented, the pulps remain alive, and as fast as the roots have resorbed, the alveolar bone has been rebuilded. Speaking broadly, we have there an osteoclastic action destroying the tooth root, rapidly followed by an osteoblastic action, which fills in the space in the alveolar bone which would otherwise be left by the destruction of the tooth root, if this bone building did not occur. It is also to this phenomenon that we may attribute the firmness with which the partly resorbed teeth are attached, the resorbed portions being in effect held by bony anchylosis just as implanted teeth are held, as will be presently shown.

Thus we find in the pictures of the first case presented that, though the roots of the teeth have been resorbed, the alveolar bone appears normally intact.

Quite the contrary is true in the pathologic cases; not only are the pulps dead, whether they die first and cause the abscess and resorption, or whether they die because of the resorption and infection from the tumor, but also we find that the same energy, whatever it is that destroys the tooth root, likewise destroys the alveolar bone, as is plainly seen in the two illustrations, Figs. 8 and 9.

Another type of pathological resorption may be called traumatic, and at first would appear to be closely analogous to the special condition under consideration.

I have known cases where an erupting third molar has caused resorption at the distal aspect of the second permanent molar. I regret exceedingly that I have no such picture to show you, but I shall earnestly endeavor to obtain one before publication. The point of interest, however, is that in these cases the resorption continues until the pulps become affected and die. I should like to see myself, and to have for your comparison, pictures of such cases in order to study the appearances of the alveolar bone, so that we may see whether the destruction is confined to the tooth root or includes the alveolus.

Implanted Teeth.

The clinical or radiographic picture of resorption occurring after the death of a pulp, we have seen in Fig. 8, where we noted that there is also a destruction of the surrounding alveolus. But there is one more type of resorption, that which occurs about an implanted tooth. For some years after the inception of the operation of implanta-

tion there was much discussion as to how such teeth are retained. There is little doubt, however, that the rotation of events is about as follows: Whether the socket be a drilled socket, or an old socket reamed larger, we have a traumatic injury, to repair which an osteoblastic action is set up. If no tooth were implanted this reparative process would continue until the socket were completely filled in. By introducing a root of another tooth we bring into position a foreign body, and nature at once attempts to evict the intruder. Osteoclasts appear and attack the root.



Fig. 10 (Ottolengui)



Fig 11 (Ottolengui).

Where the implanted member becomes firm it is due to the fact that the osteoblastic has overcome the osteoclastic action. The osteoclasts have eaten bays into the cementum, and the osteoblasts have builded bone therein, so that anchylosis occurs.

Fig. 10 shows the root of a tooth implanted by myself, and was taken one year after the operation. A comparison with the roots of the teeth adjacent shows how different is the attachment. In the adjacent lateral and central we see the space around the root caused by the presence of the pericementum, and we note the clean, smooth appearance of the roots. In the implanted tooth we see the pericemental space bridged across with bone, and the entire tooth root roughened.

Fig. 11 is from another implanted tooth, taken about two years after replantation. Perhaps I should say, to be accurate, that both these teeth were replanted teeth, having been accidentally knocked out. This particular case was implanted by another dentist, and the root filling, of course, is his. The patient is in my care at present and I made the radiograph partly to record existing conditions, and partly for use in this discussion. Here we note even more clearly than in the other case the retention by bony union, and we learn that osteoclastic action may

be so closely followed by osteoblastic that a root may be held fast though partly resorbed.

Here, again, we have a condition not entirely analogous with that to which I am specially calling your attention. We are dealing here with a non-vital root, and one which is an intruder whether replanted or implanted. Moreover, we must note that the destructive action attacks all surfaces at once, and does not begin at the apex and proceed toward the tooth crown. The osteoblastic action in one case is entirely behind the tooth root, and in the other it surrounds it. But there is another



Fig. 12 (Schamberg).



Fig. 13 (Lange).

condition still, which I also regret my inability to show you, but which I hope to obtain.

Where an implanted or replanted tooth has once become firm, some traumatic or other cause may inaugurate a new resorptive action. This will have its origin at the apex of the root and will proceed toward the crown exactly as we see the deciduous teeth resorb, until finally it is held so slightly that it is loosened and is either exfoliated or extracted. It would be interesting to have pictures of such teeth and note the appearance of the surrounding bone during this destructive action.

Problematic Influences of Erupting Teeth.

Coming back to our original problem, we must ask ourselves "what has caused the resorption of the roots of the four incisors?" It would relieve us immensely, could we be sure that the advancing cuspids have inaugurated the trouble, but we have objections to meet with this hypothesis. One is that in similar conditions in the third molar region the pulps die; a second is that we see so many similar conditions without resorption of the permanent teeth that are in the paths of those erupting abnormally, that we would be compelled to

explain the further problem, "why does the advancing cuspid cause resorption in some cases and not in others?" Lastly, and more important, I will presently show you similar resorptions where the permanent cuspid is congenitally absent.

Fig. 12 is an excellent radiograph, in which we see a malposed cuspid erupting without damage to the permanent teeth, since we see the outlines of the lateral and central roots showing through the shadows of the cuspid.



Fig. 14 (Lange).



Fig. 15 (Lange).

Fig. 13 is a similar condition. As touching on another phase of this subject to which I have yet to come, please observe that the root of the deciduous cuspid is almost completely resorbed, despite the fact that the cuspid is quite distant and advancing in another direction, whereas the lateral and central which appear in its path are intact.

Fig. 14. A similar case also shows no injury to the lateral.

Fig. 15 is of the same character.

Fig. 16, supplied by Dr. Schamberg, is somewhat different. The cuspid is approaching in a fairly normal manner, except that it is mesial of normal: the root of the temporary cuspid is somewhat resorbed so that if the advancing cuspid has the power to resorb a tooth root we may question why it has apparently been deflected from its path, when it should have destroyed the temporary cuspid root and taken its proper place? We again note that the lateral which is in the path of the cuspid is intact, but the apex of the central shows trouble of some character Here, however, if I read signs aright the resorption, if any exists, is clearly pathological, the alveolus being involved. However, the radiograph is not very good and a diagnosis in regard to the central is not dependable.

In regard to Fig. 17, however, we have no doubt. I regret that I

do not have the history of this case, also from Dr. Schamberg, but whatever it be, here we note the reverse of Fig 13. Here, once more, the deciduous cuspid root has resorbed, although distant from the path of the cuspid. The cuspid seems to have completely ignored the lateral root in passing, whereas the root of the central has totally disappeared. It is just as difficult to explain why the lateral has escaped, as to declare that the central has been destroyed by the cuspid. These be two horns of a dilemma.

Thus we find that though the resorption of the roots of the four



Fig. 16 (Schamberg).



Fig. 17 (Schamberg).

teeth in the case first presented might naturally be considered as pathological, nevertheless there is a closer analogy to the resorption of the roots of deciduous teeth, which, of course, is a physiological occurrence. Thus it will not be amiss to spend some time in considering the resorption of deciduous roots.

Resorption of Roots of Deciduous Teeth.

Here we have a normal and constantly recurring sequence of events, which has undoubtedly been studied by many histologists, but we do not find that the scientific gentlemen have as yet arrived at a single and definite explanation of all the phenomena. Perhaps the most widely adopted theory is to the effect that the oncoming permanent tooth is in some way a factor, or cause of the resorption. In regard to the details of this there is a variance of views, some believing that the advancing tooth, or tooth sac, causes pressure which inaugurates the resorption. One argument is to the effect that the resorption of the deciduous tooth will start at the point nearest to the advancing tooth and that it will proceed in the direction of the long axis of the path of the oncomer. Pictures which I will show fit this view very well, but they



Fig. 18 (Schamberg).



Fig. 19 (Van Woert).



Fig. 20 (Van Woert).



Fig 21 (Lange).



Fig. 22 (Lange).

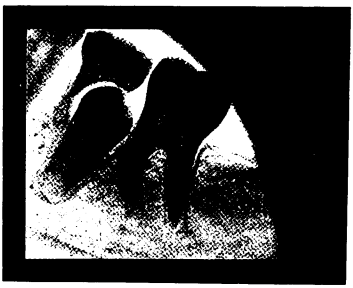


Fig. 23 (Schamberg).

fit equally well with quite an opposite theory, which is that the part of the deciduous root which resists resorption deflects and so alters the direction of approach of the erupting tooth. Another view is to the effect that the sac of the erupting tooth generates a "resorptive organ" which is the destroying agent. Were this true we could understand the destruction of any root impeding the arrival of the new member, whether deciduous or permanent. But were this explanation correct we would be at a loss to comprehend such conditions as seen in the last illustration (Fig. 17), where a deciduous tooth distant from the advancing cuspid shows resorption, while the lateral incisor directly in its path has escaped, and the central incisor which it is just reaching has completely lost its root.

Fig. 18 is a perfectly normal condition. The deciduous tooth is losing its root, and the bicuspid is, as it were, arriving on time. Were this constant there would be no difficulty in solving the problem, except, indeed, that one theory would fit the facts as well as another, which, of course, would lead us no nearer to a final knowledge than we are at present.

Fig. 19 is similar and shows such a state of affairs as would result if the tooth in the last picture should continue to advance and its predecessor to resorb. At this time the roots have disappeared and the deciduous crown is about to be shed.

Fig. 20 brings us face to face with an early stage of one of our orthodontic problems. Is this deciduous root resorbed as it is because of the false direction of the bicuspid, or has the resistance to resorption, or let us say, assymetrical resorption, caused a deflection of the bicuspid? Gentlemen, this is a question of importance to us, because a knowledge of the truth would aid us mightily in deciding when to extract the deciduous tooth.

The Author's Views Upon Resorption of Deciduous Roots.

And now I shall enter upon the dangerous hazzard of expressing my own views. If the histologists all agreed upon this matter I should not venture, but since they are at variance one more theory can scarcely befog the issue much.

As the latest American work on histology is from our well-known and much-admired Dr. Fred'k Noyes, I very naturally consulted his book, hoping to obtain his views upon this subject, but in this I failed. He gives us some beautiful microscopic pictures of sections showing dentition at various stages, but unless I have overlooked it, there is nothing explaining the resorption of the deciduous roots. In speaking of the eruption of the deciduous teeth themselves, however, I find this statement:

"Usually, somewhere between the seventh and ninth months after



Fig. 24 (Schamberg).



Fig. 25 (Schamberg).



Fig. 26 (Lange).



Fig. 27 (Lange).



Fig. 28 (Lange).

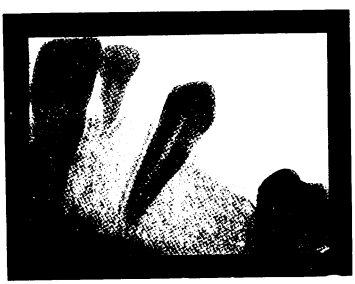


Fig. 29 (Lange).

birth, the growth of the central incisors causes the absorption of the roof of their crypts, and the tooth moves occlusally, cutting through the "soft tissues." The author does not tell us in detail how the advancing tooth absorbs the roof of its crypt, but he says it is the result of growth, and speaking of growth, elsewhere he tells us that growth creates a force, which he calls "growth force." He says that this "force" is "the result of the multiplication of cells of the tooth germ, and is exactly comparable to forces exerted by the multiplication of cells in any position." Then he continues and says: "For instance, the force exerted by the multiplication of the cells of a rootlet of a plant is sufficient to force pebbles aside and make an opening through hard-packed earth."

After this he practically tells us that all bone growth is dependent upon this "growth force."

All this is beautiful in theory, and, moreover, it may be true, and yet it does not appeal to me as logical, though I admit it may be histological. I do not mean to imply that the multiplication of cells does to create a force. This is proven by the simile of the rootlet moving earth and pebbles aside, but that the stress exerted by this force influences growth elsewhere or in adjacent tissues, does not appeal to me. Moreover, let me point out that the growing vegetable root thrusting aside pebbles is not exactly analogous with the growth of a tooth root which is surrounded by living tissues. It seems to me that these living tissues are not moved by the force of the multiplying cells of the tooth germ, but that they move or grow, as the case may be, energized by forces within, rather than without themselves, and in obedience to the mysterious law which causes all cells or aggregations of cells to aim at the production of type.

Without going into histology, or biological chemistry, which I am quite satisfied to leave to the specialists in those fields, I believe that the resorption of the roots of deciduous teeth is in no physical sense dependent upon the eruption of the successor. I believe that the resorption of the deciduous root is merely a fixed step in the normal plan. The law which governs the development of the individual demands that he shall have two sets of teeth. As stages of this routine the crowns of the deciduous teeth are formed and then their roots. In due season, these roots resorb, not because of any influence exerted by the oncoming tooth, but because they must be removed out of the way, that the advancing tooth may arrive. In other words, it is a retrogressive metamorphosis, which is just as vital to the plan, as was the original building up of the tooth. If this be true, then it would follow that in the regular order, the roots of deciduous teeth could, and often would, resorb in spite of the fact that no permanent tooth germ were underlying it, and this is exactly

what does occur, as I shall abundantly show you. In support of the view that the deciduous roots are resorbed by pressure or growth force, if you wish to call it that, exerted by the oncoming tooth (I am using Dr. Noyes's expression, but he has not said this. I merely adapt his phraseology to a general belief), it has been pointed out that in a strictly normal cycle the resorption of the roots of a deciduous molar will assume the form and fit as a matrix over the bicuspid tooth. But this clinical fact quite as well fits in with my theory, and I believe that this co-adaptation is a fortuitous circumstance rather than a result consequent upon the presence of the bicuspid. Consider for a moment! Nature has ever found the best method of advancing its aims, and an important aim here is that this grinder shall be firmly fixed as long as possible. If the roots of the deciduous molars were resorbed, as are the roots of incisors, the molars would very much more quickly become loosened. But when resorption occurs as it does normally, the destruction occurring along the inner and underside of the roots, it follows that the mesial and distal surfaces of the roots may be retained longer, and the roots thus have a greater length and proportionately greater stability. I think I shall be able to show you resorption of this character, the deciduous root assuming the form of an advancing bicuspid despite the fact that no bicuspid is present.

This brings us to a different reading of the assymetrical resorption of roots. We have still to study out the chemistry of this solution of a tooth root, as well as to consider the destructive agents which are making the attack, most probably osteoclasts, before we can determine why it is that the deciduous root at times does not resorb, or resists resorption. But I leave that also to the histologists, and will merely record the clinical fact that such resistance does exist. And it is my view that when it does occur, this resistance, or persistence of the deciduous root causes a deflection of the permanent tooth. I do not, however, mean that all deflections or misplacements are traceable to this cause, for I have already shown misplaced and badly deflected cuspids, where the resorption of the deciduous teeth was normal.

Fig. 21 is a good illustration of possibilities. The first deciduous molar is resorbing normally, and the bicuspid is arriving normally. The resorption of the second molar is quite normal and symmetrical and yet the bicuspid is arriving abnormally.

In Fig. 22 the picture is quite different. The mesial root of the temporary molar has persisted, and consequently the bicuspid is erupting distal of normal. In this instance it is possible that the distal root of the deciduous molar was also resistant of the resorbtive agent, or else



Fig. 30 (Lange).

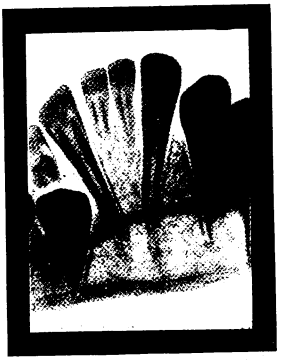


Fig 31 (Langc).



Fig. 32 (Schamberg).



Fig. 33 (Schamberg).



Fig. 34 (Schamberg).



Fig. 35 (Schamberg).

the agents themselves were inactive, for note here that the bicuspid is still unerrupted, whereas the second permanent molar is in place.

Fig. 23 is practically a duplicate of the last in regard to the bicuspid and the deciduous molar, but here, curiously enough, the second permanent molar appears to be entirely absent. If the tooth has been extracted, it would fix the condition at almost the same period as in the last case. At all events, it shows that such conditions are not uncommon.

Deciduous Roots Resorbed Without Successors.

I said that I could show you cases of resorption of deciduous roots in the absence of permanent successors, and I will now present that evidence.

Fig. 24 shows a deciduous second molar typically resorbed, with no bicuspid present.

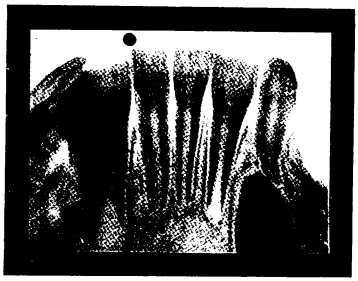


Fig. 36 (Lange)

Fig. 25 shows two deciduous molars with roots resorbed, and neither of the bicuspids present.

Fig. 26 shows a deciduous molar resorbed almost to the point of shedding, with no successor.

Fig. 27 shows two deciduous molars with roots resorbed, and no bicuspids present.

Fig. 28. Deciduous molar with roots resorbed and no bicuspid present. I would have you note that this condition seems more often occurring in connection with the second deciduous molar than with the others, at least so far as I have been able to collect radiographs. This condition occurs elsewhere, however, as I shall show.

Fig. 29 shows an upper temporary lateral, resorbed with no permanent lateral present.

Fig. 30 shows another deciduous lateral with root resorbed and no permanent lateral present.

Fig. 31 shows two deciduous lower centrals with roots resorbing and no permanent centrals present. The cuspid region, however, exhibits normal conditions.



Fig. 37 (Schamberg).



Fig. 38 (Schamberg).



Fig. 39 (Schamberg).



Fig. 40 (Schamberg).



Fig. 41 (Schamberg).

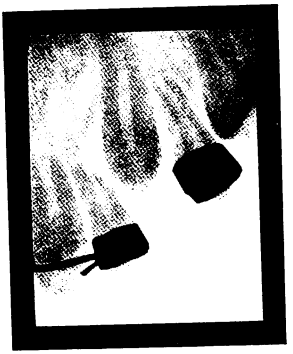


Fig. 42 (Schamberg).

I will show you now illustrations of a case occurring in my own practice.

Fig. 32 shows the right side in the upper arch and we see the deciduous lateral with root resorbing and no permanent lateral present.

Fig. 33 shows the left side of upper arch of same patient, and we see the deciduous lateral incisor, cuspid and first molar all with the roots resorbed and no permanent successors present.

Fig. 34 is the right side of lower arch of same patient. Conditions are progressing normally in the region of the first bicuspid, but once more we find the second deciduous molar resorbed and no permanent tooth below it.



Fig. 43 (Schamberg).



Fig. 44 (Schamberg).

Fig. 35 is the left lower side of same patient, and now we have both bicuspids absent, yet both deciduous molars are resorbed typically.

I mentioned heretofore that it is possible that resorption of the deciduous tooth may not occur even though the permanent tooth be present. This is exactly the reverse of the conditions which I have been showing, but is an argument in the same direction as it is opposed to the theory that the advancing permanent tooth causes destruction of the tooth which may be an obstacle in its path.

Fig. 36 is an excellent example. Here we note the deciduous cuspid with root untouched by resorption, while the sac of the advancing cuspid is in contact with it.

Views of Dr. Broomell.

In outlying my own theory of the resorption of deciduous tooth roots I avoided the histological explanation thereof, but I can give you the opinion of one well-known histologist, Dr. Broomell, whose views are not contradictory of my own, though more scientific in supply-

ing detail. I merely state the belief that the resorption of the deciduous tooth roots is not dependent upon any excitation from the permanent successor, and I offer radiographic proof of clinical facts which substantiate this contention. But, unless I misundertood him (his views



Fig. 45 (Schamberg).



Fig. 46 (Schamberg).



Fig. 47 (Schamberg).



Fig. 48 (Schamberg).

were communicated to me orally), he believes that at the opportune time there appears at the apex of each deciduous tooth root what may be called a "resorptive organ," whose office it is to destroy the root, and thus clear a way for the permanent tooth. If this can be demonstrated, then perhaps we may be able to account for the resorptions recorded in connection with the first case, as well as with those that are to follow, which, be it remembered, show more clinical resemblances to the physiological resorptions of deciduous roots than to any of the pathological resorptions which I have described, because the pulps remain living and the alveolus is rebuilt behind the resorption.



Fig. 49 (Schamberg).



Fig. 50 (Schamberg)

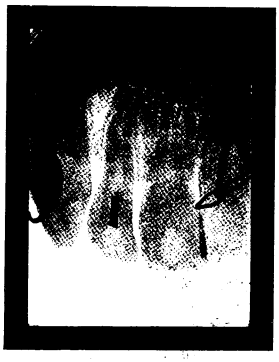


Fig. 51 (Ottolengui).



Fig. 52 (Ottolengui).



Fig. 53 (Ottolengui).



Fig. 54 (Ottolengui).

Normally man is supposed to have but two sets of teeth, but in sporadic cases we find additional or extra teeth erupting. If it be true that the deciduous teeth are resorbed by a resorptive organ which appears at the apex of the root, is it not within the realm of possibility that a similar condition might occur, as an eccentric act of nature, at the apex of a permanent tooth?

I advance this postulate, but I cannot say that I am quite prepared to adopt it. If my own case were the only one of its kind, I might do so, but, unfortunately, I have found others.

I will now present the radiographic records of four cases, occurring in the practices of Drs. Young and Kemple, and I would like those gentlemen to give us the clinical histories of their cases. The first case, Master B., is a patient of Dr. J. Lowe Young.

Fig. 37 shows the upper right side. The cuspid is seen erupting. The root of the temporary cuspid has resorbed, and we note that there are signs of resorption of the permanent lateral. In this instance the picture is quite like that of traumatic resorption, as the destruction has not involved the apex, but seems to have occurred just in line of the advancing cuspid. I believe, however, that this pulp has remained alive, and this would not be the expectation if the resorption were strictly pathologic. Nevertheless, there is room for argument here. But observe that the apex of the central appears to be affected.

Fig. 38 shows the left side of same case. The lateral root is as yet unaffected, but the central has much the appearance of its mate. These two radiographs were made November 29, 1909. Interference was instituted and radiographs taken February 15, 1910, only forty-seven days later.

Fig. 39 shows the changed position of the teeth on the right side and no noticeable difference in the appearance of the affected roots.

Fig. 40, however, of the left side discloses that the apex of the lateral incisor has been considerably shortened. The next radiographs were made on October 12, 1910.

Fig. 41 shows the cuspid erupting nicely, with the lateral and central about as before.

Fig. 42 shows the left side, taken at the same time. The final radiographs were made on June 12, 1912.

Fig. 43 shows the right side, with new bone apparently built into the resorbed portion of the lateral root.

Fig. 44 shows the left side. Candor compels me to point out that there is no certainty that the central incisor roots have been resorbed. They do not appear normal, but, then, perhaps they never have been normal. We know, however, that the lateral incisor roots have suffered,

and it is possible that in this case the resorption of the laterals has been due entirely to the advance of the cuspids, yet it is strange that the pulps should have remained alive.

The next case, Miss C., is also a patient of Dr. Young's.

Fig. 45, from a radiograph made October 26, 1909, shows the left side of the upper arch, and we see a cuspid crowding into place. Apparently there has already been some resorption of the lateral incisor.

Fig. 46 shows the condition on January 11, 1910.

Fig. 47 shows the appearance on March 18, 1910.

Fig. 48. On February 6, 1911, a radiograph was taken which, I am sure, will surprise you. It is seen in Fig. 48, where we note a distinct resorption of the four upper incisor and roots.

I admitted that the previous case might have been purely traumatic and restricted to the laterals, yet here, where the lateral suffered less than in the previous case, the depradation is much greater, almost as bad as in the case of my own patient.

The next case was a patient of Dr. Kemple's, and discloses rather extraordinary conditions. I am sure that some of those present are saying to themselves, "Of course, the cuspids did it." But please note the last two cases I have to present. The first radiographs were made January 24, 1910.

Fig. 49 shows the right side with a cuspid erupting. The lateral root is seen to be intact, but the central seems to be resorbing.

Fig. 50 shows the left side in very similar condition. The last radiographs were taken April 13, 1913, and appear in the next two illustrations.

Fig. 51 shows the right side with cuspid brought into position, but the root of the central incisor is badly resorbed, the lateral, however, being still intact.

Fig. 52 shows the left side, which is quite similar. The last case which I have to show you is rather unique. I do not know the clinical history. The illustrations are not as good as I would like, but the patient lived out of town and we have not been able to get another sitting. One point of peculiar interest is that the cuspids being congenitally absent, can hardly be the mischief makers in this instance.

Fig. 53 shows the right side. It is evident that there is no permanent cuspid. We note the temporary cuspid present and not resorbed, though the resorption of the alveolus about this tooth and the lateral as well, seems to leave them with very little bony attachment But the central either has lost its apex or else never had one.

Fig. 54 shows the left side. Here we see resorption of the apices

of the deciduous cuspid, the permanent lateral and the central. Yet there is no permanent cuspid.

Gentlemen, I trust that this rather hastily compiled record of radiographic data may result in inspiring some brighter and more scientific mind to take up these problems for us.

Discussion of the Paper by Dr. R. Ottolengui.

Dr. F. G. Kemple, New York.

The radiographs shown by Dr. Ottolengui seem to open up a new field of difficulty and complication and study, not only for the orthodontist, but also for the physiologist and the pathologist. Just what causes the roots of the deciduous teeth to absorb, I believe is still an unsolved problem in physiology, but we recognize it as a normal physiological process and have, therefore, been content to answer the question in this manner. But the absorption of the roots of permanent teeth, which are to all appearances perfectly healthy, is a phase of the subject that has not been very deeply studied, or at least it has not been discussed in dental literature. It is this phase of the subject that so vitally interests the orthodontist, and I hope that Dr. Ottolengui and others will continue to study and discuss this question from year to year until a satisfactory solution of the question has been reached.

When an orthodontist discovers a beautifully developed permanent tooth, strong and of good structure, becoming very loose—apparently almost ready to drop out of its socket—he is suddenly seized with something very akin to heart-failure.

The first case of mine shown by the essayist was that of a boy past thirteen years of age, who was slow in erupting his teeth. At this age he still retained three lower deciduous molars and an upper deciduous cuspid. The upper molars and bicuspids had drifted forward and had reduced the space for the permanent cuspids to about one-half the required amount. The first radiographs showed the permanent upper canines to be directed mesially with their crowns lying over the labial surface of the ends of the roots of the permanent laterals, pressing the roots of the laterals in a lingual direction and causing their crowns to be tipped forward. The central incisors occupied a normal vertical position. These radiographs were made for the purpose of locating the permanent cuspids, and neither the radiographer nor myself noted any resorption or apparent non-development of the roots of the central incisors. I supposed the radiograph had been taken at an angle that did not show the full length of the root of the centrals. In the treatment the centrals were disturbed very little, almost all of the force being

exerted to move the molars and bicuspids distally. About eight or ten months after I started treatment, the upper central incisors became very loose, so loose that I feared they would be lost. I immediately had other radiographs made, but these did not show, apparently, any more resorption of the roots of the centrals than did those that were made ten months before, but they did show a closer encroachment of the crowns of the cuspids on the roots of the centrals. This gradual encroachment of the crowns of the cuspids on the roots of the centrals, and the extreme looseness of the centrals made it seem imperative that the cuspids should be moved away from the roots of the centrals. An incision was made through the gum, the outer plate of the alveolar process was cut away and the crowns of the cuspids were exposed; small hooks were cemented in the crowns of the cuspids and elastic ligatures were applied to force the eruption of these teeth and to draw them away from the absorbing roots of the centrals. After this operation the centrals very soon became firm in their sockets, and radiographs made by Dr. Ottolengui two and a half years later show no increase in the resorption of their roots. It is needless to say that these teeth were not disturbed in any way during the remainder of the treatment.

The second case of mine which the essayist showed is not quite a fair example to submit, if we are examining normal conditions. The patient, male, nineteen years of age, underdeveloped both physically and mentally; all of the lower teeth and nearly all of the upper were badly affected with pyorrhea, and the two upper permanent cuspids were congenitally missing. Such a condition can hardly be regarded as normal.

The essayist has shown cases where the roots of deciduous molars were resorbed when there were no apparent successors present. This would indicate that the force of the erupting permanent tooth is not the only factor in causing the resorption of the root of the deciduous tooth. He could also have shown any number of cases where the roots of deciduous teeth were not resorbed when there were no permanent successors present, as well as showing, as he did, other cases where the roots of these teeth were not resorbed when the permanent successors were present. This might indicate that root resorption is entirely independent of the pressure from another erupting tooth. If this be true, it is important that we learn as soon as possible what are the active elements in root resorption, and whether or not they can be controlled.

All of these questions of congenitally missing teeth, root resorption, malocclusion in about ninety-eight per cent. of the human mouths of civilized peoples, pyorrhea and caries, lead me more strongly to the belief that the human denture is undergoing a retrogressive evolutionary change that may be more rapid than we suspect; and while these changes

are taking place there is no law except the law of variation to account for these different conditions. Unless some means be found by which the original function of the dental organs can be restored, dentistry cannot hope to hold in check the growing tendency toward such conditions as those with which we are trying to battle.

Dr. Martin Dewey, Kansas City. This question of the physiologic and pathologic resorption of the roots of teeth is a very interesting one, and after everything we know has been said, there is much more yet to be said. Dr. Ottolengui has opened up a problem that will have to be approached from several different views. As regards the cause of resorption of the deciduous teeth, Dr. Ottolengui quotes from Noyes very correctly, but he misinterprets him. He says the advancing permanent teeth cause resorption of the deciduous teeth.

Dr. Ottolengui. No, I did not.

Dr. Dewey. The theory is held that the advancing permanent teeth does have something to do with the resorption of the deciduous teeth. It is not permanent pressure that causes the resorption of the deciduous teeth. If the crowns of the permanent teeth ever touch the roots of the deciduous teeth resorption stops in that area. Why? Because there is not tissue between the roots of the teeth and crown. The organ which causes resorption of the roots of the teeth, whether physiological or pathological, is the osteoclast. I do not believe, as Broomell does, that there is a special resorption organ. I do not believe there is any special organ or development of organs, or development of cells that causes resorption of the deciduous teeth. The osteoclasts are there all the time, but conditions must be brought about to cause them to work.

There are two general constitutional conditions which materially affect the resorption and non-resorption of roots of teeth. These are tuberculosis and rickets. Rickets present a clinical picture which cannot be misinterpreted, but it has been overlooked.

Several years ago I was referred to a series of articles and monographs by Dr. Hertzler, professor of surgery in the University of Kansas on these two particular diseases, written by Dr. Jenner, who was professor of diseases of children in London. He wrote these monographs on rickets, tuberculosis and abdominal tumors. In rickets, as far as dentition is concerned, the first thing that occurs is a tardy eruption of the deciduous teeth. The first deciduous tooth will not make its appearance as early as it should. Finally, when it makes its appearance, the next thing that occurs is its early loss. The reason it is lost early is because of imperfect calcification of the roots. If the child has a rickety dia-

thesis, the roots will be faultily calcified, and the roots of the first permanent molar will be calcified to a great extent sooner than the lateral. The root of the deciduous cuspid being the last tooth to be calcified in the deciduous set, necessarily it occupies a close relation to the time of calcification of a portion of the permanent incisor. So in the cases in which Dr. Ottolengui shows where the root of the permanent central is resorbed and the roots of the cuspid and lateral are not resorbed, there is a difference in resorption because of the difference in the time of calcification. There is imperfect calcification of the roots of the central, but not of the lateral.

In tuberculosis you have just the reverse. Teeth erupt on time. Deciduous teeth make their appearance at the proper time, but are not lost at the proper time. The root is not resorbed because, in my mind, the osteoclast is simply a specialized leucocyte. The leucocytes, especially in cases of tuberculosis, are extremely busy. They have more important work to do than the resorption of the roots of the deciduous teeth. Tuberculosis does not interfere with the eruption of the teeth nor with calcification. A permanent tooth calcifies just the same. It meets with opposition and is deflected.

Children with tuberculosis are mentally equal to or above the normal; they have fair skins, good red cheeks and they have the entire clinical picture which goes with tuberculosis. These are the cases in which the teeth resorb slowly. In rickets the bones are large, the wrist joints are large. There is a thickening of the epiphyseal cartilage. The upper arches are badly contracted. As a result of that, these two constitutional diseases are responsible, in a large measure, and are causes, of why in one case the roots of the teeth are resorbed, while in other cases they are not.

As to the pathologic resorption of the teeth, that is a little different, because necrosis accomplishes it, and you will have necrosis of tissue around that neighborhood, and you do not have the rebuilding of the bone as in the case of resorption of the roots of the teeth which Dr. Ottolengui shows. There is resorption of the alveolar process around the roots of the tooth. The osteoblasts rebuild the bone. The root of the tooth is missing and does not rebuild because the dentine papillæ has completed its work and is never reformed.

Dr. Federspiel. Is there a decrease or increase in the leucocytes?

Dr. Dewey. An increase. The osteoclast is a specialized leucocyte, and the leucocytes are busy somewhere else. Cure a case of tuberculosis and resorption of the roots of the deciduous tooth will take place. I do not think moving the teeth have been responsible for the resorption of the roots of these

teeth. We must go back further than that in searching for the cause. The cause may have been in faulty calcification of the roots in the beginning. Roots of permanent teeth have been resorbed that have never been moved.

Dr. Ottolengui has cited cases confined to the incisors. He has related cases confined to the centrals, and not laterals. There were cases in which he found the central root was not resorbed, but the lateral was affected, again because of the difference in the time of calcification and conditions which were present at the time the teeth were calcifying.

In the presence of a certain constitutional condition there is faulty calcification of the root and bone around the root; then when the constitutional conditions become fully normal, and the rickety diathesis disappears the osteoblasts produces the development of bone at the end of the tooth. The pulp has nothing to do with the resorption of the tooth. We have never demonstrated that an osteoclast was ever present in a pulp. Resorption always occurs, or osteoclasts are found in the region which has to do with the peridental membrane. The osteoclasts resorb the roots of the teeth gradually. The blood vessels are not disturbed, consequently the pulp is not disturbed, and following resorption there is rebuilding of normal bone. I do not know but that it would be interesting to find out in these cases whether the resorption stops or progresses until the whole tooth is lost. If the whole root were faultily calcified, the whole root of tooth would probably absorb. When we got down to normal dentine the resorption would stop. Bone would build around there, because the osteoblasts being present, normal development of bone would take place just the same as we would have it in physiologic resorption of deciduous teeth.

Resorption of the roots of the deciduous teeth is a strange thing. The part of a deciduous tooth that is first resorbed is not always that portion close to the permanent teeth. You will find areas of resorption on the side of the tooth. There will be certain areas of resorption at different places. There will be an area cut out of the cementum and the dentine, and then the cementum built over again, and that tooth will be patched in that particular region. The apex in the area of resorption will grow, will build in, and the fibers will become attached; the roots and the tooth cut off and built on again to give a nice masticating apparatus.

In those cases Dr. Ottolengui cites, resorption of the root does not occur in the whole broad surface at one particular time, but a portion is cut off, and then probably cementum is laid down and dentine is cut off until we get down to normal dentine, and then it builds over and stays there without any further resorption. The reason a central incisor

becomes resorbed and not a lateral is due to imperfect calcification of one and perfect calcification of the other.

It is well to pay more attention to constitutional conditions as being the etiologic factors in resorption and non-resorption of the roots of teeth than to consider all these teeth as being alike. They are not all alike. If the teeth that were resorbed were abnormal, I do not think the moving of them had anything to do with it. The reason we have a dead pulp in pathologic resorption in tumors and abscesses is because we have other pathologic conditions besides those in the cases which Dr. Ottolengui has related.

Dr. J. Lowe Young, New York City.

I am very glad we have had this paper by Dr. Ottolengui, as I have had some cases in which there has been resorption of the roots of the permanent teeth and with the permission of the Chair I will describe these cases, for I am sure the essayist wishes to get all the evidence possible regarding such phenomena.

Before describing the cases in which resorption was found I would like to describe another case, because with our present knowledge I would consider it criminal to treat such a case in the way I treated it at the time, which was several years before I ever heard of or saw any evidence of resorption of the roots of the permanent teeth.

Case I.

Case I, was that of a boy twelve years of age. His upper incisors were very much separated and the roots converged, and the radiograph shows that the unerupted cuspids appeared to be pressing the lateral roots against the central roots. I constructed an appliance so as to force the roots of the lateral incisors against the crowns of the unerupted cuspids with the hope of moving them distally, and I did it to such an extent that one of the cuspids was a little too far when erupted. As far as I know there was no resorption in this case, but I did not have a second radiograph taken. I wish to repeat that I would not think of such a method of treatment now.

Case II.

A case of a young lady with an impacted upper cuspid on one side, the lateral in contact with the first bicuspid, was referred to me by a dentist who had been associated with the dentist that cared for the teeth of this young lady's mother. After I procured models the dentist called on me, and when I told him what I intended to do, he said: "I am afraid to have anything done for this young lady. They are personal friends of mine, and the mother of that child has lost her four upper incisors due, we think, to the regulation of her teeth by means of rubber plates. The roots resorbed, and the four incisor crowns dropped out.

I would not have this girl's teeth lost for anything." I said to him, "you need not be alarmed about that," and without any radiograph I opened up space enough for the cuspid which, apparently, was quite ready to erupt; but as it did not put in appearance as soon as I thought it should, I had a radiograph made, and then, to my surprise, I saw the condition of her incisors. I retained the case and waited for the cuspid to erupt and the incisor roots to move forward, as this case was treated with an expansion arch and ligatures. After *several months* the cuspid began to erupt and the incisors that had been rotated drifted back a little and the roots did not move forward.

After Dr. Angle showed me his new appliance, I was tempted to apply it to this case, but before doing it I had another radiograph taken which showed that the roots were no better, but possibly a little worse, so I decided to let them alone, as the cuspid had then about erupted to the point where it touched the lower teeth. I have not seen this young lady in a year and a half, but when last seen, her incisors were firm. I saw this patient's dentist April 1, 1914, and he had seen the young lady very recently and he reported her teeth in fine condition.

Case III.

Figs. 37 and 38 show radiographs of the unerupted upper cuspids of a boy twelve years old. On the one side you will observe the area of resorption was not on the end of the root, but on the side of the root and on the other lateral there is very little resorption on the end of the root. You will also observe that the four incisors are quite separated or fan-shape. The appliance used in this case was so constructed that the roots of the incisors would not be carried apart and thus press on the unerupted cuspids, but the crowns of the incisors would be moved toward the median line and thus brought in contact, hoping in this way to prevent further resorption. Figs 43 and 44 show radiographs after treatment and in them you will observe that the lateral on which there was resorption on the side of the root got no worse; the other lateral on which there was slight resorption at the end of the root got very much worse. While these teeth were a little loose, they were never alarmingly so. The incisors were retained by bands on the laterals with a lingual wire soldered to them, but after six months the laterals were found to be as loose as when put on. It was decided to remove this retainer and band the centrals with a lingual wire soldered to them and extending distally to each lateral and thus prevent the incisors separating, but permitting a freer movement of these teeth when in use, and I am pleased to say they soon became quite firm and, as far as I know, are all right now.

I was very much pleased with Dr. Dewey's discussion. There is one point I would like to have had him speak about, that is if he can

throw any light on the apparent resorption of the side of that one root. It could not be due to imperfect calcification on the side of the root.

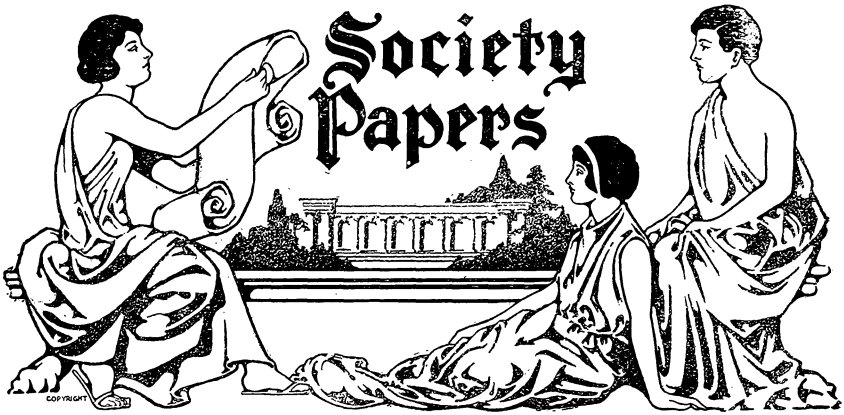
Dr. Monroe. Was there any rickets or tuberculosis in the mother's case in Case II?

Dr. Young. No. The grandmother of this child lived to be eighty-six years of age, and the mother was wonderfully well developed, and so was the girl. She was a splendidly developed girl and large for her age. Her mother was a very large woman. The father I never saw and do not know what kind of teeth he had.

In Case III the father was a large, healthy looking man, but the mother rather frail. The boy, while well developed mentally and above average in size, seemed below par physically.

Dr. Ottolengui. (Closing the discussion): I want to call attention to one point I did not think of when writing the paper, and that is, in both of my own cases, and in one of Dr. Young's, and one of Dr. Kemple's we had to deal with what might take place on both sides. In Dr. Young's case the maleruption was only on one side, and yet all four teeth were cut off. It is hard to comprehend that one erupting cuspid caused a disturbance which went right across and cut off the roots of four teeth.

To come back to my own cases for a moment, I would report the fact that this child was once a mouth-breather. In my view a child may be a mouth-breather and yet not be emaciated. Fat may be a result of faulty metabolism, which may be accentuated by faulty breathing. This child was a mouth-breather, and had had adenoid growths removed. She was a fat child. You will observe there was a lapse of one year and one-half in the course of treatment, and one of the reasons for that lapse, was that she developed an acute Bright's disease.



Cast Gold Inlay Making by the Impression Method.

By Dr. W. Ray Montgomery, Buffalo, N. Y.

Read before the Union Meeting of the Third and Fourth District Dental Societies at Schenectady, New York, October, 1913.

This paper should in no wise be construed to be a discussion of the relative merits of the gold foil filling and the gold inlay, each of which has its own wide field of usefulness, but when the cast gold inlay is indicated there are two different methods of procedure by which the wax pattern of the inlay may be obtained: the direct method and the indirect or impression method.

The direct method is the original Taggart method. By it the wax pattern is formed directly in the tooth cavity in the mouth.

The indirect or impression method consists of obtaining an impression of the cavity, and from this impression a model which is an exact reproduction of the cavity, and in which the wax pattern may be formed and the inlay afterwards burnished and finished outside of the mouth.

The advantages of this method for many cases are great and the results to be obtained so superior that it is doubtful if any person having mastered the technique would revert to the direct method for the class of cases requiring very extensive occlusal restorations or extending far beneath the gum line, even should they continue to employ the latter for the more simple fillings.

The impression method may also be used for porcelain inlays and in crown work for reproducing root ends, but this paper is confined to its use in connection with the gold inlay.

If I am correctly informed, the original conception of taking impressions of cavities by bringing stress to bear upon compound at direct

right angles to the cavity margins is also that of Dr. Wm. H. Taggart. Dr. Van Woert, of Brooklyn, obtained the suggestion from Dr. Taggart and devised the system of making the trays which will be described. The technique which will be given is the original, with such alterations and modifications as have crept in from time to time during the two years of its use in our office.

Technique.

After properly preparing a cavity for the reception of a cast gold inlay, an impression tray is made for it, in which to take a modeling compound impression. A new tray is made for each individual case. The metal for this should combine thinness with stiffness. It must be thin enough to pass readily between the teeth and stiff enough to hold the impression material firmly in place. Any sheet metal combining these properties may be used. Platinoid plate obtainable from the supply house in three (3) inch squares is superior to anything else that we know of. No. 34-gauge is the thickness most often used, but where approximal space permits, as heavy as 30-gauge may be employed.

The fundamental principle to be kept in mind while constructing the tray is, that the impression material must be carried with equal force to all parts of the cavity with a pressure that is at right angles to all of the margins. If this precaution is not taken, and a margin is approached at an obtuse angle, the compound will creep on that margin and the impression will fail.

Construction of Impression Trays.

Hence, if an impression is to be taken of a disto-occlusal cavity in a molar or bicuspid, a strip of the metal is cut slightly wider than the cavity at its widest part and the corners at one end are rounded. A measurement is taken from slightly below the gingival margin to the occlusal plane of the tooth, and at this distance from the end of the strip of metal it is bent sharply at right angles. By so doing, the tray may be passed between the teeth until it rests firmly against the occlusal surface, with the assurance that the gingival margin is covered and that the gum tissue is not being unduly impinged. The remainder of the strip serves as a handle. If the cavity margins lie entirely on the distal and occlusal surfaces so that the tray as now formed approaches all of them at right angles, bend the vertical edges of the approximal portion of the tray slightly inward, to give this a concave surface, and it is ready to use. If, however, one or more margins have been carried onto other surfaces, this form of tray must be so modified as to approach these margins at right angles. Thus, for a buccal or lingual margin the tray will be cut slightly wider and bent around over

that surface. If a cusp is absent or the occlusal portion of the cavity has been extended to include a groove on another surface, a tongue may be cut and bent over. Your own ingenuity will enable you to readily form a tray for any required condition.

If the cavity is a mesio-occlusal, proceed as before, but at a point on the handle which is slightly back of the distal portion of the cavity, bend it back upon itself, thus allowing the handle to protrude out of the mouth. In the case of a mesio-occluso-disto cavity no handle is necessary. Bend a piece of the metal staple shaped to fit the case. The impression tray ready, the impression is to be taken. For this the Kerr, otherwise known as the Detroit Modeling Compound, is preferable. The stick form is very convenient. A quantity slightly in excess of that required to fill the cavity is heated over the flame. The tray is also heated and the compound placed upon it.

Dr. Van Woert advocates punching holes through the metal with a plate punch so that the compound will pass into the holes and be kept from dragging when forced into place, but if the precaution is taken to have the tray hot when the compound is placed upon it, it will adhere so that no trouble will result from its pulling away. On the other hand, if the holes are punched in that part of the tray going between the teeth trouble is often experienced from the compound forcing through the holes and wedging against the approximating tooth.

Taking the Impression. The compound being on the tray it is passed over the flame until thoroughly soft, then allowed to stiffen slightly and again passed quickly over the flame to resoften the surface more than the rest of the mass, so that the stiffer portion underneath will carry the softened surface firmly to place, giving a sharp definite impression. In case of an approximal cavity, after pressing firmly to position, it is well to hold it with a finger of the left hand over the occlusal portion while a thin burnisher is passed between the teeth, forcing that part of the impression into the cavity. Care must be taken to keep up the pressure until the compound is thoroughly chilled, otherwise if the tray has sprung slightly at the bend, it will spring back and ruin the impression. It is not necessary to use the burnisher when the teeth are close together, but it gives added space which is acceptable when removing. When the compound is thoroughly chilled, examine it, and with a sharp lancet trim off any that may interfere with its ready removal.

Taking the Bite. An accurate impression having been obtained, a bite is taken. This is needed:

1st. As a guide in carving for occlusion.

2d. To direct us regarding approximal fulness and contrast.

3d. To give the remainder of the form of the tooth containing the cavity and the relationship of its neighbors. It may be obtained by taking a mush bite in either base plate wax or compound. The compound is more to be depended upon for accuracy. By including several teeth in the bite, the models may be oscillated, thus showing the proper form to be given the occlusal surface for anatomical occlusion.

The cavity is now sealed and the patient dismissed. The inlay may be completed, ready for cementation in the laboratory at your leisure, and there is much of the detail work that your assistant may easily be trained to do.

Amalgam Models.

The most satisfactory material known as yet for making the model is amalgam. Opinions differ as to the superiority of a silver—tin or copper amalgam. The writer's experience is limited to the former. Cement may be used when the inlay is to be of porcelain, but for gold, this material is not strong enough to allow burnishing and finishing. In order that the amalgam may be well condensed it is necessary to surround the impression with a matrix. This is done by forming a mass of plaster on the slab. When quite stiff, so that it will not run, the impression is imbedded in it and the plaster moulded about it as desired. If preferred the plaster may be placed in a rubber ring such as is furnished with a mouldine outfit or a metal ring made in halves. When the plaster is sufficiently hard examine it carefully to see that all the margins in the impression are clear and well exposed. Scrape the plaster smooth about the compound and it is ready for the amalgam.

In order that all the details of the impression may be sharply reproduced it is necessary that the amalgam be mixed somewhat thinner than for filling. The portion used to cover the walls and margins should be quite wet. This is inserted in small pieces and gently rubbed over the surface of the impression. The first layer is covered with more which is much dryer and considerable more pressure is used, rubbing and tapping as well as pressing it to place. The remainder of the mix should be quite dry. Only by doing this part of the work with care can a sharp, accurate model be obtained. Any excess of mercury is wiped away or absorbed with tin foil. When the amalgam is sufficiently hard the plaster matrix is broken away and the model separated from the impression. In the bite, an impression of the tooth cavity will be found and the model is accurately adjusted to its complement in the bite. One model is now run in plaster, and an excess left to the distal of the last tooth, which is trimmed down to a horizontal plane and a notch cut in it. This is varnished, and the opposing model run, allowing plaster to flow over onto the notched surface to denote the correct position of the models

when separated. After lubricating all surfaces with which the wax may come in contact with either vaseline or equal parts of castor oil and glycerine proceed with the insertion of the wax.

By the direct method the wax is properly softened and forced under pressure so that it goes to all parts of the cavity and all margins are perfectly covered. The same procedure may be followed when inserting the wax into the amalgam die, but in shallow approximal cavities in long teeth it is often difficult to drive the wax perfectly to all parts of the cavity and the writer has resorted to the method of flowing the wax into the cavity with a warm spatula. Theoretically this is very bad practice as a wax made up largely of beeswax and paraffine, as all carving waxes are, expands very rapidly as its temperature rises, which means that although a cavity may be full of hot wax, it will not be full when the wax cooks, and as wax brought to a liquid state is much hotter than when only softened, it follows that a cavity filled with molten wax will not be as full when this cools as it would have been had it been filled with moderately warm wax. However, this discrepancy may be largely overcome if it is melted in a very little at a time, one layer covering another and filling in the space left by the shrinkage of the preceding. By carrying the spatula into all the grooves and deep portions of the cavity the wax will fill it and a plus fulness is left over all the margins to be trimmed down. We have succeeded in obtaining very snug fitting inlays in this way. The lubricant will prevent the wax from sticking to the model.

When the cavity is full, allow the wax to harden. Resoften the occlusal portion and place the opposing model in position. By allowing the wax to harden, then softening only the occlusal surface, in the case of approximal cavities there is not the danger of driving the wax out of the cavity that there is if a mush bite is taken in soft wax. The occlusion is now definitely defined and the possibilities for reproducing lost cusps, sulci, grooves, ridges, etc., are only limited by the skill of the operator. And not only to reproduce beautiful occlusal surfaces, but to produce occlusal surfaces which occlude.

The space between the die and the approximating tooth in the model has been filled across solid with wax and as the function of the approximating plaster tooth is to define fulness and position of the contact point, it may now be broken away, thus exposing the entire approximal surface, including the gingival margin of the inlay. It is a simple matter having it thus exposed to trim and polish this surface of the wax and see that there is no excess at the gingival margin.

Now that the wax pattern is carved just as the finished inlay is to be, all scratches and instrument marks are removed and the surface beauti-

fully polished by rubbing it with a small, hard pellet of cotton, slightly damped with either oil of cajaput or oil of eucalyptus, and allowing a thin coating of the oil to dry on the surface. Probably the best place for the insertion of the sprue wire is at the contact point. It is not only centrally located but will give an excess which may be finished down for tight contact. The sprue wire should be very firmly attached to allow of considerable handling without becoming loosened. The pattern is now removed from the die.

Reasons for Hollow Inlays.

There are four very good reasons why the internal part of the wax pattern should be cupped out.

1st. In vital teeth to allow for a considerable thickness of cement as an insulation between the inlay and that part of the cavity directly over the pulp.

2d. By diminishing the bulk of metal the shrinkage is reduced.

3d. By forming a retention box in the inlay added retention is given.

4th. A saving of material which otherwise is a needless waste.

A very convenient way to do this is to hold the inlay by the sprue wire and with a sharp rose bur of medium size in the engine to bur away the superfluous wax. If Taggart's wax is used it may be burred out so that light may be seen through it and still be sufficiently thick. This method is also applicable to the cutting out of the inner portion of the wax when cusps are cast on shell crowns, thus securing an even thickness over the entire occlusal surface.

After carefully brushing and wiping away the shavings, replace the wax pattern in the amalgam die and see that it goes nicely to place. Examine the margins to see that none has been injured, in which case it is but the work of a moment to add more wax and polish it, when the pattern is ready for investment. If Taggart investment is used, coat the wax with investment material taken from the surface of the mix. This is thinner and smoother and will produce a smoother casting. After pickling the cast inlay in hydrofluoric acid to remove every particle of the investment material, and cutting off the sprue, place it in the die and examine it. If the work has been accurately done in certain cavity forms it will be found to fit well. In other cavity forms, however, the shrinkage will prevent perfect seating and it will appear that the gingival margin has drawn away. This, in the mouth, under the gum is hard to detect or remedy, but in the die it is easily burnished tight. With an orange-wood stick and the hand mallet gently tap it. Burnish all margins thoroughly and polish all of the surface except the immediate margins. The inlay is now ready for the tooth. Try it in the cavity; verify the occlusion; adjust the contact point and cement to place. Burnish gently and when the cement is sufficiently set, polish the margins.

Inlay with Post.

If the inlay is to include a post to be inserted in the root canal proceed as follows:

Fit the post so that it may be removed without binding and in the same direction that the inlay draws. Have it project into the cavity sufficiently so that it will become firmly imbedded in the impression. After the impression is taken, coat the post with a very thin layer of hard wax. Proceed to make the amalgam die and mount it. By warming the post sufficiently to melt the wax, it may readily be withdrawn, the wax burned off and the post replaced loosely in the die. It will be withdrawn with the wax pattern and the gold cast to it.

Faults Observed in Inlays.

In building wax patterns in dies outside of the mouth, where close observation is possible, the writer has been impressed with the following facts:

1st. That in filling a cavity with inlay wax and causing the patient to grind into it, or in other words, taking a "mush bite," the wax is often caused to creep away from the cavity walls.

2d. That often the gingival margin does not fit tightly. This we have always supposed to be due to a shrinkage at this particular point. It has recently been explained by Dr. Price, of Cleveland, however, to be due to a shrinkage of the entire mass which in inlays having the M. O. D. form, or having occlusal dovetails, are prevented from being perfectly seated.

3d. That in the mouth, particularly well up under the gum line, it is very difficult to detect this fault, which may be proven as follows:

Take an inlay which does not fit the gingival margin tightly in the die. Place this in the tooth cavity in the mouth. With a fine explorer go over the cervical portion and it will be found to be difficult to discover that it is not a perfect fit. Replace the inlay in the die and with a heavy burnisher draw it down so that the cervical joint is made tight. Replace in the tooth and it will be found to seat itself as perfectly as before, thus proving that there must have been a space in the first place. This observation, together with a few others in which I have been able to examine minutely the gingival margins of otherwise beautifully fitted inlays made by the direct method, leads me to surmise that we may be having more poorly fitting gingival margins than we suspect.

4th. That reducing the bulk of metal, by cutting out all superfluous wax, very materially reduces shrinkage.

Disadvantages of Impression Method.

The two most apparent disadvantages to the impression method are:

1st. In adding the several intervening steps between the original and the final operations there

is added opportunity for distortion, expansion and contraction of materials and other errors.

2d. The increased length of time required to carry through the operation.

Regarding the first, I am convinced that a perfect model may be obtained of a properly prepared cavity and the advantages of being able to complete the work under minute inspection, and to largely correct errors which, at the present time are unavoidable, far outweigh this disadvantage. The time question is solved if an assistant is trained to do at least a part of the laboratory work.

Advantages of Impression Method.

Its advantages, as we see them, are summed up as follows:

A very material saving of time to the patient in the chair.

In case of an imperfect wax model, failure in investing or casting, the patient is not inconvenienced.

All margins both in wax and gold may be more minutely examined, even with a magnifying glass, if desired.

In carving the occlusal surface, particularly when the restoration is extensive, the two methods will not bear comparison.

It is being recognized more and more that if we are to restore disordered oral cavities to the state of health in which they should be that more attention must be given to the perfect restoration of tooth form. In connection with this, one of the leading dentists in the country has described his procedure by the direct method, as follows:

"I have the rubber dam in place whenever it is possible to have it, and as I carve the inlay wax directly in the cavity, I have no guide whatever but a general knowledge of tooth forms, and it is not strange, therefore, that not infrequently I guess wrong, and so find my inlay, when cast, too high for the occlusion, however pretty the carving may be. Some men say they take a "mush bite," so-called, before carving the wax. This has not been satisfactory to me. Others carve the inlay, and then try in the wax, allowing the patient to close the bite. In this way I have a few times spoiled in one moment an inlay that I had spent thirty miutes in carving. In any event, it is a risk to the margins to try a wax patern in the mouth and have the patient grind upon it, and a mere closure does not disclose the interference which may develop under a free movement of the mandible. It is my belief that with a thorough knowledge of normal tooth forms, and of abraded tooth forms, and with practice in carving, one may become so dexterous in carving the wax that when the finished inlay is seated it will not be too high. In any

event, these high points should develop on the cusps, and consequently. if the sulci and grooves have been made deep enough, the correction of the inlay may be made after the gold is cemented to place by using a carbon paper and grinding with the tiniest of carborundum stones."

Is it possible, gentlemen, that as nearly perfect results from the standpoint of utility, to say nothing of artistic possibilities, are as likely to be obtained in this way as would be if the tooth were held in the fingers directly before the eyes and with model of the occluding teeth at hand with which to prove the occlusion with no danger of muscles over which you have no control, contracting and ruining the work of a half hour?

Finally, as up to the present time, we have not been able fully to control expansion and shrinkage, and, therefore, an absolutely perfect fitting inlay is impossible, and as cement lines will disintegrate, it seems logical that all gold inlay margins should be burnished and the rational place to do this, without danger of pulverizing enamel, is in the amalgam die, furnished by the indirect method.

The Dentist and the Public Health.

By Albert H. Stevenson, D.D.S.,
Secretary, Oral Hygiene Committee, N. Y. State Society.
Read before the Central Dental Association of Northern New Jersey.

More than six hundred thousand of the lives lost in the United States last year were due to preventable diseases and from accidents. This is more than the total number killed in all our wars since the signing of the Declaration of Independence. There are now almost two million persons ill from maladies that are preventable by means at present at the disposal of science. These appalling statistics, compiled by the life insurance companies, testify to the justice of the demands of the ninety million human beings dwelling in this country for proper measures to safeguard the health of themselves and their progeny.

Among other efforts toward reducing this startling aggregate may be mentioned: Isolation of contagious diseases, sanitation, improved ventilation of public and private buildings, sewerage, removal of refuse from urban and rural communities, pure food laws and regulation of diet, all tending to protect and increase the resistance of the human body.

Responsibility of Dentists.

As guardians of the portal of this body, have not the dentists a very grave responsibility? In the practice of a profession that is concerned directly with the very entrance to this body, what is the

relation of the dentist to the public health and its alarming record of mortality and invalidism? It is at least his duty to practice most rigidly prophylaxis, to advocate strict hygiene of the mouth, and to have a full knowledge of those considerations that are detrimental to good health as producing a condition of malhygiene of the oral cavity.

Under the caption of Malhygiene must be considered: Faulty bridges and crowns, ill-fitting dentures, overlapping and poorly polished fillings, malposed and irregular teeth, orthodontic appliances, carious teeth, abscessed roots, loose teeth, pyorrhea, improper diet and wrong application of the toothpick, the dental floss and the tooth brush.

Modern standards and technique of dental procedure leave nothing to be said of reparative operations in the foregoing. The difficulty of keeping arches with malposed teeth in a cleanly condition we are well aware of, and the loss of function with consequent malnutrition is evident to all. With one or more orthodontic appliances added to such a mouth a condition of malhygiene certainly obtains. Ordinary methods of cleansing as practiced by such patients do not suffice, and more rigid hygiene should be insisted upon. Several brushes shaped to reach all corners should be supplied by the orthodontist.

The Unclean Mouth.

With a mouth containing carious teeth, abscessed roots, or a condition of pyorrhea, the effect upon the general health must be considered. We have no right to limit our attention to local manifestations. Bacteria are evident in every mouth, and many varieties have been isolated. All the elements for their proliferation are present: water, oxygen, carbon, nitrogen; conditions are favorable in temperature, darkness. (1) Consider then the improperly cleaned mouth, with an area of decomposing animal and vegetable matter. What a fertile field this presents for the organisms that find entrance through the unprotected orifice. It was generally believed that the bacteria of the common infections, viz., diphtheria, pneumonia, scarlet fever and typhoid invade the body through the air passages, but Jonathan Wright and other investigators find that the turbinate bones of the nose and the ciliated epithelium covering the mucous membrane of the nose act as sieves or screens and prevent most bacteria from entering the throat, bronchi or lungs by this route. (2) The mouth, therefore, must be the chief route by which these infections reach the lungs or stomach. The function of the stomach may be impaired by this bacterial invasion. The hydrochloric acid, Nature's great germicide, is able to overcome the bacterial attack that occurs with the normal acquiring of food, but the constant ingestion of pyogenic material from a septic mouth oseriously interferes

with and may prevent the normal secretion of the hydrochloric acid. (3) This may result in subsequent disturbance of the process of digestion.

With a wound on the surface of the body, the bacteria and their toxins are eliminated with the surface discharge, but where there is any lesion of the mouth, an alveolar abscess, for example, the septic material is swallowed or disposed of by the lymphatics or the blood. If the resistance of the tissues is high, and the individual in excellent health, this daily toxic dose may be taken care of, but the effect falls upon the entire alimentary tract. Dr. E. C. Kirk calls this the "toxic habit," and like all offensive habits it becomes apparent to others before it does to the afflicted. Other evidence showing the results of oral sepsis could be cited. The increase of papers on this subject appearing in the medical cournals is encouraging. Our good brother, the medico, is awaking.

Diet.

Incomplete as has been research along the line of dietics, we have enough to merit observation and application. Dr. Alfred Kunert, of Breslau, Germany, advises black or rye bread instead of the common flour loaf. He also finds as a result of his investigations that with whole rice as the staple food there is a diminution of the tooth lesions. Dr. Sim Wallace, of London, has divided foodstuffs into two classifications: non-cleansing and cleansing. In the non-cleansing he classifies all farinaceous and all sugary food in general without fibrous element; examples: new bread without crust, bread soaked in milk, milk puddings, porridge and milk, preserved fruit, chocolate and all sweets, honey, sweet biscuits and cake, bread and marmalade, bread and jam; and of the liquids, cocoa and chocolate. He declares these foods should not be eaten unless followed by the cleansing kind. These are fibrous foods generally, such as fish, meat, bacon, poultry, uncooked vegetables (cooked vegetables are as a rule cleansing, but in a less degree than uncooked), stale bread with crust, toasted bread, twice baked bread, pulled bread and cheese, fresh fruits (those requiring thorough mastication, as apples) fatty foods (as butter and margarine); of the liquids, tea, coffee, buttermilk, water, soups and beef tea. (4) With the modern quick-lunch counter as an adjunct to the high school, the "pastry lunch" served to the children should be of interest to the dentist. The water supply of the community is also a factor, and an analysis of it might reveal a deficiency of lime salts and solve many mysteries of his daily practice.

Rules for Oral Hygiene.

There being no uniform rules of oral hygiene, even among the dentists, this hygiene has not been receiving serious consideration by our educators. We all, I believe, agree that there should be a brush,

even if we do not agree as to its form and embellishment. We must decide upon a practical application of it, adopting one of the several good methods now advocated, then advise its use, not once a day, nor twice a day, but *after every meal* and upon retiring. The only way to keep the mouth clean is to remove the débris immediately. According to the findings of Miller, Black and Kirk, the saliva "per se" has no germicidal power. With fermentation almost immediately occurring, the fertile area previously referred to is created. Why not, then, while giving instructions, advise correct and efficient hygiene? We should impress upon our patients the method and the frequency of the cleansing operation, with advice as to the proper dentifrice and the use of the dental floss. The exaggerated claims of germicidal powers attributed to the mouth washes and lotions should be exploded and these agents relegated to their proper sphere of usefulness. This would be genuine enlightenment.

These efforts alone are not sufficient. The dental societies must, for the time at least, become educational factors. Oral hygiene, in its modern capacity, is new. It is new to the pedagogues, new even to many dentists. We must take the initiative, as our schools do not teach it. An indication of the present status of oral hygiene in the curriculi of the public schools of the large cities of this country may be obtained from the following table. This data was presented by the writer to the Fourth International Congress on School Hygiene and obtained from the signed statements of Superintendents of the Departments of Education of nine of the leading cities: Baltimore, Boston, Cleveland, Newark, New York, New Orleans, Philadelphia, Seattle, San Francisco. (5):

MOUTH HYGIENE IN THE PUBLIC SCHOOLS

City	*Periods per Week	Earliest Grade Taught	Dental Inspection	Tooth Brush Drill	Text and Reference Books	Public Lectures
Baltimore	2	1st	Yes	No	Conn's Elem. Phy.	Night School only
Boston	1	1st	Yes	Yes	Conn's-Jewetts Richie-Millards	Yes
Cleveland	1	1st	Yes	Higher Grades Only	Gulick's Series	Yes
Newark	1	1st	Yes	Yes	Ritchie's Primer Krohn's Phy. Smith's Primer Gulick Series	To Teachers
New York ...	1	1st	Yes	Yes	Gulick Series	Yes
New Orleans..	2	1st	Yes	No	Krohn's Phy.	Yes
Philadelphia ..	2	1st	Yes	No	Many	No
Seattle	1	1st	Yes	No	Ritchie's Primer Gulick Series Wood's Hutchinson	No
San Francisco.	1	1st	Yes	No	Ritchie's Primer Caldwell's Primer	No

*Period—one-half hour Phy. and Hy.

It will be noted that all have dental inspection and teach mouth hygiene from the first grade; however, but one-half an hour is allowed each week for the entire subject of physiology and hygiene in seven of the above cities, and but three have the tooth brush drill. Of the text and reference books cited, not one contains mouth hygiene as it is understood and applied by the dental profession. The City of New York, in its new syllabus in physiology and hygiene, prepared by Dr. C. Ward Crampton, has a graded system wherein by proper correlation with other hygienics the mouth is given its deserved importance. Dr. R. Ottolengui, of New York City, together with the writer, in collaborating with Dr. Crampton, proved most conclusively the value of the tooth brush drill, and it has been incorporated in the syllabus. The city of Newark reports a series of practical lectures delivered to the teachers in the four centers, meeting at the Franklin School, Warren Street School, Hamburg Place School, and Belmont Avenue School. By this means the teachers were prepared directly to teach the application of mouth hygiene in the classroom. These lectures, I understand, have now been discontinued.

One of the first steps in a dignified educational campaign would be to interest the department of education. With the interest would come co-operation, and after the inclusion of mouth hygiene in the school syllabus and text books the dental society would be relieved of all further responsibility in the schools. For the public there is the illustrated lecture, always popular; the exhibits, always convincing to the ignorant class, and the motion picture medium. There is one film now in circulation and others are being prepared. A London experimentor is preparing a film showing bacteria in motion. The public has a very wholesome respect for bacteria enlarged and thrown upon the screen.

Dental Clinics.

Dental clinics have been successful, if we judge by the amount of suffering they have relieved. Dr. Ernst Jessen, of Strassburg, Germany, has made a careful résumé of the clinics of Germany, Switzerland, Sweden, Austria and Denmark. Dr. Sim Wallace has done the same with the clinics of Great Britain. (6-7) Their reports, as do all from various parts of the United States, pay a tribute to the excellent work accomplished by the perfected dental clinics. But these clinics have not, and never will, offer a solution as to how forty-five thousand dentists can care for the mouths of ninety million. Without detracting one iota from credit due the workers in these clinics, or the relief they are giving to humanity, educationally the dental clinic helps but little. Operators cannot be supplied rapidly enough to respond to the great demand, and there is plenty of pain-relieving work to be done without time for prophylactic treatment or education. It is here that the dental nurse will ulti-

mately fill the gap. She has rightly been called by Dr. Fones, "The Keystone of the Oral Hygiene Movement." This nurse, or prophylactic assistant, could cleanse these mouths and could instruct in hygiene. Legislate her into existence or not, she will come, and before long, as have come all the good things we now enjoy, from necessity. The time is not far distant when a clean mouth will be as compulsory as school attendance, and the one cannot be enjoyed without the other.

Hardly a civic health report is issued but contains reference to the deplorable conditions of mouths. Some are direct challenges to the dental profession. Here is one from one of our best organized health departments:

"The largest number of physical defects found have been those of the teeth. The relation of decayed teeth and unclean mouths to malnutrition, adenitis, and the liability to contract cantagious diseases, is too well known to merit more than passing comment. Most of the children showed a more or less complete lack of dental hygiene, their mouths, in many instances, being filthy to a degree almost unbelievable. Some interesting facts have been emphasized by the examinations: First, almost complete lack of dental treatment; second, the importance of preventive dental treatment. Could these children have had proper dental treatment, the present deplorable conditions could have been reduced 75 per cent., to say nothing of the influence of these conditions upon the health of these would-be wage-earners." (8)

You see, gentlemen, we are confronted with a responsibility greater than the skillful reparative work we are doing. To our profession is given the privilege of caring for the gateway to this temple we call the body. With our equipment and our attempts to minister to that body through the care of the mouth we have an obligation—a contract—to fulfill. "The obligation of a contract," says Calhoun, "belongs not to the civil or political code, but the moral. It is imposed by an authority higher than human, and can be discharged by no power under Heaven without the assent of him to whom the obligation is due. It is binding on conscience itself." It is the fulfillment of this contract that will place our profession where it rightly belongs.

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The Great Illinois Celebration.

The Golden Anniversary of the Illinois State Dental Society will be recorded in dental history as one of the greatest professional meetings ever held. Three thousand bronze buttons, intended for distribution among the society's members and guests who registered, were soon exhausted. One thousand celluloid buttons were then procured and quickly distributed, and an additional supply of five hundred were also used up on the first day. These registered forty-five hundred added to the several hundred students and the unregistered men who arrived during the evening or on the second day, swelled the actual attendance to over five thousand.

International Clinics.

The international clinics, by men from all parts of the United States and Canada, were scheduled to begin at thirty minutes past ten o'clock on Monday morning, March 23d. The actual time of beginning these demonstrations was thirty minutes past ten o'clock on that Monday morning. This evidence of promptness and dispatch was the keynote of the entire three days' proceedings. Everything occurred as planned and at the time set. Monday afternoon was also given over to clinics by visitors, the international clinicians numbering one hundred and seventy-seven. Many of these clinics were of exceeding interest, but as one visited table after table, he could but be struck by the fact that the casting process in some form was being demonstrated in all parts of the

great hall. What a revolution has been wrought in dental practice by this one invention.

Oration on Operative Dentistry.

An interesting clinician was still explaining his process to a small crowd at six o'clock. Yet before eight o'clock, this same room had been cleared of tables, and twenty-five hundred persons were already seated, watching the rythmical movements of two professional dancers engaged to amuse the audience while assembling.

At eight o'clock the president, Dr. Logan, struck his gavel and introduced Dr. Edwin T. Darby to deliver the oration on "Operative Dentistry." Dr. Logan explained that Dr. Darby, after preparing his paper had fallen ill, and in these circumstances Dr. Edward C. Kirk had kindly consented to attend and read Dr. Darby's address, with an addition thereto by Dr. Kirk himself. However, the fates had been kind, Dr. Darby had fully recovered and was present in person.

Dr. Darby was received with an ovation which evinced the high esteem in which he is held throughout the country. His oration described the difficulties with which dentists contended, at about the time of the founding of the Illinois Society fifty years ago, and dating from that period he recited a graphic story of the many important changes in dental practice. The oration attracted the hushed attention and interest of the immense audience, and was in itself a masterly résumé of the theme. Dr. Darby was followed by Dr. Kirk, who practically took up the subject where Dr. Darby left off. Dr. Kirk's all too brief address was a classic, and a splendid argument to prove the close relationship between the discoveries of our scientists, and the actual practice of our advanced students and best operators. Dr. Friesel followed with another fine address, and the subject was then informally discussed.

Illinois Day.

Those who left the great ballroom of the La Salle on Monday night, thinking of it as a vast auditorium, were amazed to find at nine o'clock on Tuesday morning that it had been transformed by solid partitions into five rooms, each accommodating one hundred and fifty, seated at tables, while the smaller ballroom was similarly partitioned into three rooms more of the same dimensions.

These Illinois Day Clinics proved to be as wonderful as they were unique. The guests of the society were all seated at tables arranged for ten. To each table, at the stroke of a gong, came a clinician, with all appurtenances needed for the scheduled demonstration. A master clinician stood on a chair and described the details and technique of the clinic, while the seated clinicians illustrated the work with models, specimens or apparatus, all the paraphernalia being in duplicate, so that the clinic at every table was the same.

Fifteen minutes was allowed for each clinic, and three minutes was granted for changing from one room to the next, or forty-five minutes' idle time for the audience who sat through the fifteen clinical demonstrations. So accurately was all this planned, and so well conducted, that when the gong sounded at one o'clock, all the clinics had been given in all the rooms. Over two thousand guests had seen fifteen clinics each, without leaving their seats.

Too much cannot be said in praise of the man who conceived these clinics, of the able assistants who devotedly obeyed his lightest or most seriously given order, or of the clinicians who so admirably did their part. It was the most magnificent evidence of executive ability ever seen at a dental meeting.

Oration on Crown and Bridgework.

The oration on "Crown and Bridgework" attracted another huge audience that filled the great ballroom. The orator of the evening, Dr. A. W. Thornton, of Montreal, Canada, was at his best, and to those that have heard him this means much. His address was finely prepared and splendidly delivered.

Dr. J. Leon Williams followed with a description of his researches relative to tooth forms, and Dr. A. J. Bush, of Columbus, Ohio, and Dr. Herman E. S. Chayes, of New York, responded with addresses that merited the repeated outbursts of enthusiastic applause. This evening, like the preceding one, aroused a feeling of inspiration in all.

Chicago Day.

Wednesday was heralded as Chicago Day. One hundred Chicago dentists gave clinics in their own offices. Thus, on this day, the Chicago men played hosts and received the guests in their own offices. This was another

unique, and much appreciated method of presenting clinics, at the same time affording men opportunity to see the offices of so many of their confrères.

The Banquet.

On Wednesday evening the Great Banquet. No other words describe it. The Great Banquet. The large ballroom of the La Salle, accommodating over nine hundred, and the smaller ballroom seating over three hundred more were filled. Over a thousand dentists, with some two hundred beautiful women gracing an occasion which was an occasion worth gracing! Two head tables! The upper tier seating the president and his speakers and special guests, while before him, at the lower tier, sat twenty-eight of the previous presidents of the Illinois State Society, including its very first president.

It was a glorious assemblage, and a fitting end to a marvelous meeting.

The Man of the Hour.

What is the great lesson to be learned from this wonderful meeting? This was not an International Congress, nor even a National Association meeting. It was just a State Society meeting! A State Society, however, meeting jointly with that famous local, the Chicago Dental Society. Yet the bare announcement that this was to be a great meeting, the greatest in the history of Illinois, attracted the largest attendance in the dental history of this country. Why? Because the Illinois men are known by their past performances, and what they conceive they carry out, and what they promise they perform. And so five thousand accepted the word of Illinois, and that word was kept to the letter.

So much of the men of Illinois, but what of the man of Illinois? No war is won without warriors; no battle decided without officers, and no campaign is successful without a general. And so likewise this meeting was great because of the great numbers assembled; it was successful because of the untiring zeal and devotion of the Illinois men, but the whole marvelously managed meeting was first conceived in the mind of one man. When the plan was first outlined to the members of his executive committee they declared it to be the dream of a man ambitious for his State, but a dream that could never be fulfilled. Yet,

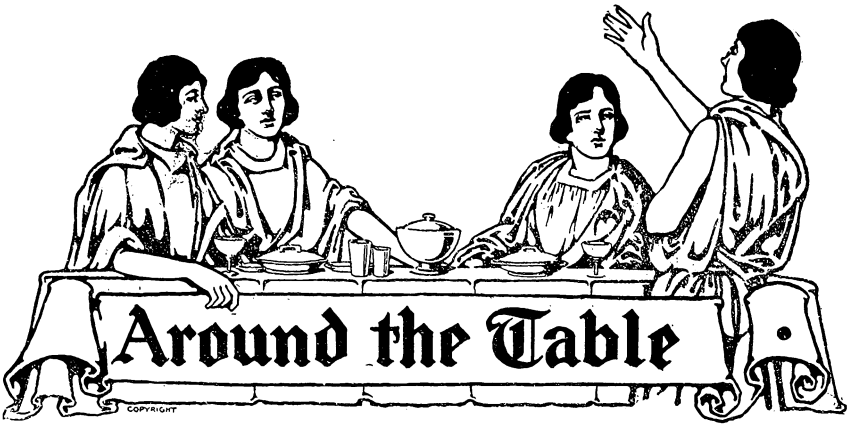
though these men prophesied failure, they did not shirk the work when they found that this dreamer was determined that the dream should be realized for the fame of Illinois. And the dream became a reality to its ultimate and minutest detail. And the name of the man who conceived, worked out and carried to success this splendid enterprise is W. H. G. Logan. All who attended this celebration came away with this man's name in praise upon their lips.

A Hint to The National.

The National Dental Association is at a critical period in its history. Reorganization has been just about achieved. The first meeting under the new regime is to occur in a few weeks. Then must the machinery for the management of a great national association be put in motion. In 1915 there is to be no meeting of the National, because of a promise to that effect made to the Pacific Congress managers. Thus the officers elected at Rochester will have two years in which to perfect the organization and to project a truly great meeting. But, speaking of even thinking of a great meeting for the National in 1916, are we not forced to recall the wonderful work of the Illinois men, and especially of one Illinois man? Would not the destiny of the National be definitely determined, if at Rochester we chose an Illinois man for president, leaving him to name Illinois men for important executive positions?

Correction.

In the March issue we published an article entitled "Local Anesthesia," by Dr. Theodor Blum, in which several type errors occurred. On page 188, line 12, "A stock solution of 0.06% sodium chloride, etc.," should have read "0.6%." Page 189, line 12; also page 191, line 15; and again on page 192, line 4, the word "interior" should read "anterior."



DR. W. L. WHIPPLE, of St. Louis, Missouri, writes as follows: "Sorry I could not dine with you that night at the Biltmore. But let me warn you that the method of removing gold crowns, as mentioned in the March issue, and as advocated by Dr. Ottolengui some years ago, is not always a success. I allude to the method of drilling a hole just beneath the cusp surface of a shell crown, and then using a long instrument as a lever to pry it off. Twice within the past year, wishing to remove a gold crown with as little injury as possible, this lever method was adopted, with the result of fracturing the natural tooth, probably due to the adhesion of the cement, since, the fractured fragment came away with the crown. As we are unable to know the condition of the crowned teeth, I have arrived at the conclusion that the method is dangerous.

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"I MAKE IT A RULE to apply the dam when treating roots, yet there are many cavities in upper teeth which may be so isolated and sterilized as to be absolutely safe to fill without the dam.

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"I KNOW THAT YOU FELLOWS in New York are radical about filling every root before applying a gold crown, but I stand with Dr. C. N. Johnson, and do not believe it always necessary. Within a month I removed a six-tooth bridge from its attachment to a third molar, which the patient stated he had worn thirty years (having been once removed and repaired), and found the pulp still vital. Many similar cases have come under my observation, though of shorter duration."

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OBSERVE THAT I have permitted Dr. Whipple to make three speeches without interruption. That is just a little sample of the sort of treatment all you fellows would get if you would just open up, and speak your little piece. Don't sit back and sulk when you read something in this department that you think you could criticize or improve on. If

❖ you knew a better way, tell it to the rest of us, and remember this: A
❖ statement is not unanswerable just because you see it in print, any more
❖ than your little narrative will be when we put that in print. That is
❖ why we are sitting around this fraternal table; so that we can talk to,
❖ and at one another.

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DR. WHIPPLE, for example, has not said the last word by any means. On
❖ the contrary he has started something, and I thank him for it. First
❖ though, he says that it is not always safe to drill a hole in a shell crown
❖ and use a long-handled instrument as a lever to pry it off. He says you
❖ might fracture the natural tooth. In fact, he knows that, because he has
❖ done it twice. That is what we want—the facts. Personally, I have
❖ never met such an accident, but as Dr. Whipple has, it must be possible,
❖ consequently we should be cautious.

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NEXT HE SAYS THAT some teeth in the upper jaw may sometimes be
❖ treated without the rubber dam. Oh, very well. So long as you do
❖ sterilize the root, and fill it aseptically, it matters little whether you use
❖ the rubber dam or some other dam way. (Notice to printer, no "n" in
❖ dam.) And I think it matters little to the patient either. I have been
❖ the patient, and know whereof I speak. I have had an upper tooth
❖ dammed up with two huge aseptic cotton rolls (sign of a red cross on
❖ the box), and a more or less comfortable clamp—principally less. And
❖ for my part I would have been just as happy, the tooth just as dry, and
❖ the rest of my mouth not so dry but more comfortable, if the rubber
❖ dam had been used.

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BUT I SAID that Dr. Whipple had started something. He started it when he
❖ said that the fellows in New York are radical. By the way I am not
❖ sure of that. A few are Bull Moose, but the majority here in Manhattan
❖ are Democrats—two varieties—Donkey and Tiger. Dr. Whipple says
❖ the New York fellows are radical because they fill all roots before they
❖ attach the bright and shining golden crowns. Honest, that is the nicest
❖ thing that has been said about the New York boys for a long time. Then
❖ he tells us that he stands with Dr. C. N. Johnson, (I am glad to hear
❖ that, because I am afraid Brother Johnson will need someone to lean on
❖ after that April Editorial of his is read by all the radiographers in the
❖ Club, or radiographers with a club, whichever way you prefer to put it),
❖ and that in his opinion, it is not always necessary to remove a pulp before
❖ placing a shell gold crown. Then he relates a real nice story about a
❖ bridge that rested one of its ends on a third molar for thirty years (which
❖ is ten years longer than the regular claimant usually claims for a good
❖ old-fashioned dental operation), and that the wise old wisdom tooth still
❖ lived to see the bridge swept away.

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CERTAINLY I AM not going to deny that a molar tooth may carry a
❖ crown for years and years and years, and still harbor a vital pulp. It
❖ is easy enough to make this discovery when the crown at last is removed.
❖ All one need do is to drill into the tooth, and if the pulp bleeds it probably

was alive prior to the experimental puncture. But the difficulty is to know at the time when one is putting the bridge on, in the first place, whether or not the particular pulp about to be hidden under a bushel of gold, will live or die! Whether it will live happily if it does live, or whether it will live unhappily and grumble for years. Because my Thoughtful Diners, don't forget that a thing may be very vital and yet very diseased. Once upon a time, I tested this matter. I removed a number of shell gold crowns, which had been placed on living teeth, and I found—

H H H

BUT THAT STORY will keep. Meanwhile, all you good fellows who have recently written to me asking for membership in the "Around the Table Club," just take up this proposition of crowning teeth with living pulps, and tell us your experiences and your opinions. That ought to make a good talk.

H H H

MEANWHILE I have been to the great Illinois meeting. Naturally, I met Callahan. We were discussing him in New York you remember, last February. He took me over to the Blackstone Grill. He would have fed me at the "La Salle," only it was so crowded with dentists (5,000 wore badges), that it was not possible to have any private converse anywhere. And Callahan had a special secret to impart. This is it: "My dear boy," said Callahan. (He calls me his "dear boy" so that I will understand my own insignificance, and because, being a pseudo-Southerner, he thinks youth must respect age.) "My dear boy," said he. "You made a blunder in regard to that rosin preparation of mine. You printed it, 'Rosin twelve grains, Chloroform three ounces,' whereas it should have read, 'Rosin twelve grains, and Chloroform three fluid-drams.'" Well, of course he had the best of it. He knows the proportions better than I do, and as he made me return the original manuscript from which I copied it, I could not prove that it was his mistake, or his typewriter girl's mistake. But naturally I had to say something, so I said: "Don't let that trouble you Callahan. If the fellows put up the prescription as we printed it, just on a sudden impulse to buy something, even though they do have three ounces of chloroform to start with, by the time they use it the proportions will be about correct, because the chloroform evaporates and the rosin does not. Also, because it takes most men some time to abandon their own method to try another man's."

H H H

CALLAHAN GASPED, by the time he grasped that, but before he recovered I had another little dagger for him. "By the way, Callahan," said I, "at the First District Meeting in New York, you showed us a fine set of specimens where you had filled the roots of teeth and then ground them down to the canals for examination. You told us you had used methylene blue with your rosin solution in order to determine whether or not the rosin solution had really penetrated the tubuli. Your specimens showed the blue stain extending in some places as far as the cementum. Dr. Nies of Brooklyn thinks you may be deceived, and that possibly your stain has penetrated farther than the rosin."

DR. NIES writes as follows: "What I sought to prove is that while methylene blue will follow the free and combined watery moisture of the tooth and stain it, a rosin solution will not do so. Specimen No. 1 illustrates this. (A tooth filled with rosin solution, followed by a gutta percha cone. The stain has not passed beyond the canal walls.) No. 2 shows how methylene blue spreads when put in free, a point of gutta percha being put in on the following day. (This specimen shows the stain penetrating quite to the cementum in places.) I do not wish to be understood as saying that methylene blue can spread through dentine only in a watery solution.

"I KNOW THAT carbolic acid does the same thing, for the following reason: I had a delicate patient who collapsed every time that I used cocaine, or painted her gum with aconite and iodine. This solution could not have carried more than a drop of aconite per application. Efforts to offset the action of these drugs with strychnine, used as an antidotal remedy, failed, so I tried forcing carbolic acid into the dentine with pressure, and was rewarded with an anesthesia that compared favorably with any cocaine solution I have ever used. I easily removed the pulp without discomfort to the patient. Later, to prove that the carbolic really passed through the dentine, I colored it with methylene blue, and with pressure forced it towards the pulp. After pressure for ten minutes I entered the pulp chamber and removed a blue pulp. This work was done on a molar, which I was about to crown."

EVIDENTLY, though living in Brooklyn, Dr. Nies must be included among the radical New York boys, since he tells us that he removed the pulp of a molar before decorating it with a crown. This is only en passant, as we French would say.

IS IT NOT ODD, how we drift from one subject to another in these table talks? We were on the topic of canal treatment, and without warning, as it were, we learn from Dr. Nies, that it might be possible to produce anesthesia of the pulp with carbolic acid and pressure. Some day, when you happen to be out of cocaine, and your druggist will not sell you any more without a prescription, and your office girl is out, and you don't know how to write the prescription yourself, I wish you would just try this carbolic acid proposition, and let the rest of us know what success you have.

BUT NOW WE MUST NOT forget that Callahan is sipping his soda-water in the Blackstone Grill, and waiting for a chance to answer Dr. Nies. Here is Callahan's side of it: Said Callahan: "Dr. Nies spoke to me in New York about the tendency of the blue stain to out-travel its vehicle. He may be right, but he was using an aqueous solution under pressure, that pressure driving blood out of the blood vessels in the pulp tissues, and replacing the blood in part with the blue stain. The rosin solution is pushed into more or less empty tubules, the tubules supposed to be dry,

❖ and furthermore, the vehicle carrying the blue (chloroform) is not a
❖ hydroscopic agent, and does not give up the stain in the presence of water.
❖ Witness, the stained teeth were ground on wet stones and since grinding
❖ have been washed many times.

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"I TRIED MANY STAINS and had just that trouble. For example—eosin.
❖ When the tooth, stained with eosin, is placed on a wet stone the stain
❖ will scatter all over the tooth, the whole tooth taking on the eosin color."

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"I DO NOT WISH to throw any cold water over this rosin proposition,"
❖ said I to Callahan, "and I hope you prove it to be the final and best
❖ method, because if ever a problem in dentistry needed final solving, it is
❖ root canal filling. But I do wish to ask one mean question. When you
❖ fill a root canal, out of the mouth with rosin solution and gutta percha,
❖ and then grind the root on a grind stone, does not that very grinding
❖ make the root filling seem better adapted to the canal, than it might have
❖ been before the grinding? And really you know Cal, we can't use a grind
❖ stone on the roots in the mouth to make the canal fillings fit better."

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"DON'T BE SILLY," said Callahan So I told him I would not. It would
❖ have been silly, I suppose, to press the question.

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"WELL, THEN," said I. "Here is another argument for you. I was talking
❖ over this rosin proposition with Dr. Taggart, in New York, at the
❖ Ritz-Carlton one afternoon, while we watched the partakers at a Thé
❖ Dansant, and ourselves partook of a couple of cups. ('Cups' is good, eh!
❖ What?) And Taggart told me that for years he had used Venice turpen-
❖ tine in canals, before introducing his gutta-percha point. He declared
❖ that he had had a bottle of Venice turpentine for years, and that it prac-
❖ tically does not alter in bulk, remaining in a semi-plastic condition, and
❖ as it has distinctly germicidal qualities, its plasticity and unchangeable
❖ characteristics in his opinion made it a useful adjuvant for root canal
❖ fillings in conjunction with gutta percha."

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ON THIS SAME general subject, Dr. Nies tells me that "Venice turpentine
❖ is a species of rosin from an Alps pine. So is Canada balsam a rosin.
❖ This substance has been used in Germany for many years as a root canal
❖ filling. Only in a slight degree do these pine rosins present any germi-
❖ cidal, antiseptic, dessicant or preservative qualities. They are only
❖ moisture proof. I sought in a synthetic combination of formaldehyde,
❖ cresol and mineral copal, an antiseptic root canal filling that might
❖ have the medicinal and physical qualities of those medicaments that had
❖ proven most successful in the hands of the profession.

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"I THINK THE MATERIALS that we use at present are not all that could
❖ be desired. We realize this when we remove a gutta percha point that
❖ has been in for a few years. These cones are frequently loaded with as
❖ much as 50 per cent. of zinc-oxide, talc or phosphate of calcium. It is
❖ the presence of these minerals that make the root filling visible in radio-

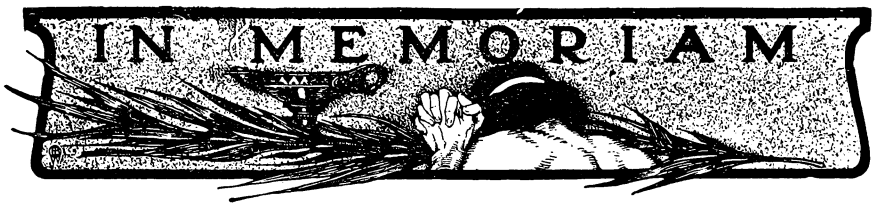
❖ graphs. I find the use of pure tin, finely pulverized, mixed in my solution,
❖ better defines the outlines of the root canal."

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"ONE OF THE POINTS that attracted my attention in your February talk,"
❖ said Callahan, "was the remark made by the Chemist in relation to cam-
❖ phor. I have tried out all the rosins, and many other substances, including
❖ amber; also camphor. Nothing so far has proven so satisfactory in my
❖ hands as the rosin. As to copal, I have some experiments with that as
❖ well as other substances under way. Canada balsam looked good for
❖ some time, then lost its attractive features. It is the time test that counts.
❖ The rosin solution has made the best record for me in four years of
❖ testing. In my opinion formaldehyde has about as much of a place in a
❖ root canal filling, as has ground glass in a dentifrice."

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CHICAGO AND BROOKLYN papers please copy that last statement.



Dr. John W. Moffit.

Died February 27, 1914, in Harrisburg, Pa., of old age, in his seventy-ninth year, John W. Moffit, D.D.S.

Dr. John W. Moffitt, a well-known pioneer of modern dentistry, and one of Nature's guileless gentlemen, has crossed to the Great Beyond.

He was the son of the Rev. John J. Moffitt, D.D., and Charlotte Eppley Moffitt; and was born at Orwigsburg, Pa., on June 5, 1835. Before he had attained his second year his father removed to the (then considered) far West, and settled in Ohio. Early dentists often combined two callings, and his father practiced dentistry in addition to attending to his ministerial duties.

Dr. John W. Moffitt received the usual school education of the time; and afterward attended Bethany College, Pennsylvania.

He early evinced an aptitude and enthusiasm for dental art. After a period of pupilage with his father, and also with Dr. Samuel Hullein, of Wheeling, Va. (now West Virginia), and thus being instructed in the then highly guarded mysteries of dental art and practice, he opened an office at Cadiz, Ohio, in 1853. Fond remembrance oft carried him back to his first plate, a silver one, because the patient was so satisfied with it, and another which followed shortly after, because the patient counted out fifty, separate, shining, one-dollar gold pieces therefor.

In 1855 Dr. Moffitt went on a trip through part of South America and the western part of the United States, and remained quite some time in California. Returning home late in 1857, he married and settled down to practice in Harrisburg, Pa. Since then, until prevented by the state of his health a few years ago, he continued in active practice, except during his service as a Union soldier in the Civil War. When under fire at the battle of Antietam he received orders to report at Hagerstown, Md., as an assistant hospital surgeon, and served in that capacity until honorably discharged in 1864.

Dr. Moffitt was one of our earliest porcelain specialists. Over sixty years ago he carved and baked porcelain blocks and teeth for his own

use and that of the profession out of materials dug up and compounded by himself. Afterward he supervised the manufacture of teeth on a large scale for some of the early manufacturers, personally carving the models, and molding, casting and finishing the bronze molds, baking the teeth, and, in fact, doing everything necessary in tooth manufacture. He always was a strong advocate of high fusing porcelain.

Despite his love for the ceramic art, being an ardent disciple of Izaak Walton, he would leave a continuous gum case to catch a trout.

Ceramics was one of his hobbies. In 1860 he was awarded a patent for non-sectional block work baked on platinum. This he later abandoned to the profession through the Odontographic Society of Philadelphia. Another patent covered a tooth for continuous gum work as now practiced. He also obtained a patent for a tooth for rubber and plastic plates. Quite recently he introduced a method of attaching teeth to the platinum plate without soldering in continuous gum work.

The first bayonet-shaped forceps were made by a Philadelphia firm from a pattern cut out in wood and submitted by him; and many old forceps show his name imprinted thereon.

Dental flasks, adjustable articulators, separators, amalgam alloys, cements, and many other products of his genius have been manufactured; but his modesty and retiring disposition kept him from claiming the honors, and ofttimes emoluments, received by others therefrom. He was a veritable encyclopedia of means and methods in the preparation of dental necessities; and his fund of information was willingly shared with all.

Obturators and artificial vela were a most successful branch of his practice; and quite recently he made an ingenious and important improvement in the construction of the latter.

He did not often place his ideas in print, although a few articles, chiefly on porcelain subjects, appeared over his signature in dental journals.

He was one of the first delegates to the American Dental Association; and at its meeting at Nashville, Tenn., in 1870, represented the Pennsylvania State Dental Society. He was an officer and charter member of the Pennsylvania State Dental Society, the Lebanon Valley Dental Society, etc., and, in fact, outlived a number of societies in which he was once prominent. He was also a member of the Masonic fraternity.

Dr. Moffitt had a leading part in obtaining from the Pennsylvania Legislature the charter for the Philadelphia Dental College, in which he matriculated in 1864. He, however, did not present himself for examination for his degree until 1888, when he graduated. From the institution of this college he acted as demonstrator in prosthetics and porcelain,

with some short intermissions, for over forty years; and hundreds of successful practitioners can look back gratefully to his instruction.

He was married in Harrisburg, Pa., on December 20, 1857, to Harriet R. Wenrick; but his entire family predeceased him. He is survived by a brother, R. H. Moffitt, D.D.S., now retired, and the latter's son, Dr. J. J. Moffitt, who is a member of the Pennsylvania State Dental Examining Board.

Interment was in Harrisburg Cemetery on March 2, 1914.

J. J. McL.

Dr. M. H. Fletcher.

When the Cincinnati Dental Society extends to the family of Dr. M. H. Fletcher its sympathy in their bereavement, it does so with a deep sense of its own loss at the passing away of one of its most beloved and inspiring members. The consolation in which the society takes refuge and which it begs the family of Dr. Fletcher to share, is the consciousness that his life was of unusual happiness, his professional career honorable and successful in the highest degree.

It was a privilege to have known so perfect a gentleman. The influence of his rare mind and character was widely felt. By its passing, not only the profession to which Dr. Fletcher contributed so much distinction, but the community at large has suffered a great loss.

The inspiration of his lofty ideals, the helpfulness of contact with such a master of the profession, the joy of companionship with a nature so genial, will be sorely missed by this society. But his memory will live long in the hearts of his brothers and will always be synonymous with the highest standards of excellence in conduct and in professional skill.

C. Stanley Smith,
J. R. Callahan,
Sidney J. Rauh,
Committee.



National Society Meetings.

AMERICAN INSTITUTE OF DENTAL TEACHERS, Ann Arbor, Mich, January 28-30, 1915.
Secretary, Dr. J. F. Biddle, 517 Arch St., N. S., Pittsburgh, Pa.

NATIONAL DENTAL ASSOCIATION, Rochester, N. Y., July 7-10, 1914.
Secretary, Dr. Otto U. King, Huntington, Ind.

AMERICAN SOCIETY OF ORTHODONTISTS, Toronto, Canada, July 2-3, 1914.
Secretary, Dr. Wm. Ernest Walker, 629-631 Maison Blanche, New Orleans, La.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., 1915.
Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

CANADIAN DENTAL ASSOCIATION, Winnipeg, Manitoba, May 26, 27, 28, 29, 1914.
Secretary, Dr. M. H. Garvin, 314 Somerset Blk., Winnipeg, Manitoba, Canada.

State Society Meetings.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., June 4, 5, 6, 1914.
Secretary, Dr. C. L. Hunt, Fort Smith, Ark.

CALIFORNIA STATE DENTAL ASSOCIATION AND SOUTHERN CALIFORNIA DENTAL ASSOCIATION, Yosemite Valley, Cal., June 29-30, July 1-2, 1914.
Secretary, Dr. E. E. Evans, Union Savings Bank Bldg., Oakland, Cal.

Items of Interest

COLORADO STATE DENTAL SOCIETY, Manitou, Colo., June 18-20, 1914.
Secretary, Dr. E. W. Spencer, 120 Pope Block, Peblo, Colo.

FLORIDA STATE DENTAL SOCIETY, Atlantic Beach, Fla., July 1-2-3, 1914.
Secretary, Dr. Alice P. Butler, Gainesville, Fla.

GEORGIA STATE DENTAL SOCIETY, Atlanta, Ga., June 4-6, 1914.
Secretary, Dr. M. M. Forbes, Candler Bldg., Atlanta, Ga.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 19-21, 1914.
Secretary, Dr. Otto U. King, Huntington, Ind.

IOWA STATE DENTAL SOCIETY, Des Moines, Iowa, May 5-7, 1914.
Secretary, Dr. C. M. Kennedy, Des Moines, Iowa.

LOUISIANA STATE DENTAL SOCIETY, Baton Rouge, La., June 4-6, 1914.
Secretary, Dr. E. B. Ducasse, Maison Blanche, New Orleans, La.

MAINE DENTAL SOCIETY, Augusta, Me., June 25-27, 1914.
Secretary, Dr. I. E. Pendleton, Lewiston, Me.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 7-9, 1914.
Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MINNESOTA STATE DENTAL ASSOCIATION, Duluth, Minn., August 6-8, 1914.
Secretary, Dr. Benjamin Sandy, Syndicate Bldg., Minneapolis, Minn.

MISSISSIPPI DENTAL ASSOCIATION, Vicksburg, Miss., June 23-25, 1914.
Secretary, Dr. M. B. Varnado, Osyka, Miss.

MONTANA STATE DENTAL SOCIETY, Great Falls, Montana, June 11-12-13, 1914.
Secretary, Dr. F. W. Adams, 14-15 Chicago Block, Billings, Montana.

NEBRASKA STATE DENTAL SOCIETY, Lincoln, Neb., May 19-21, 1914.
Secretary, Dr. H. J. Porter, Cambridge, Neb.

NEW HAMPSHIRE STATE DENTAL SOCIETY, Weirs, N. H., June 17-19, 1914.
Secretary, Dr. Louis I. Moulton, Concord, N. H.

NEW JERSEY STATE DENTAL SOCIETY, Ocean Grove, N. J., July 15-18, 1914.
Secretary, Dr. John C. Forsyth, 430 E. State St., Trenton, N. J.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 14-16, 1914.
Secretary, Dr. A. P. Burkhart, 52 Genesee St., Auburn, N. Y.

NORTH CAROLINA DENTAL SOCIETY, Hendersonville, N. C., June 24-27, 1914.
Secretary, Dr. J. Martin Fleming, Raleigh, N. C.

OHIO STATE DENTAL SOCIETY, Columbus, O., December 1-3, 1914.
Secretary, Dr. F. R. Chapman, 305 Schultz Bldg., Columbus, O.

PENNSYLVANIA STATE DENTAL SOCIETY, Phila., Pa., June 30, July 1-2, 1914.
Secretary, Dr. Luther M. Weaver, Phila., Pa.

TENNESSEE STATE DENTAL ASSOCIATION, Chattanooga, Tenn., June 4-6, 1914.
Secretary, Dr. C. O. Rhea, 625½ Church St., Nashville, Tenn.

UTAH STATE DENTAL SOCIETY, Logan, Utah, June 19-20, 1914.
Secretary, Dr. I. P. Stewart, 1st Nat. Bank Bldg., Logan, Utah.

VERMONT STATE DENTAL SOCIETY, Rutland, Vt., May 21-23, 1914.
Secretary, Dr. P. M. Williams, Rutland, Vt.

WEST VIRGINIA STATE DENTAL SOCIETY, Huntington, W. Va., August 12-14, 1914.
Secretary, Dr. A. C. Plant, 802 Schmulbach Bldg., Wheeling, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Fond-du-Lac, Wis., July 14-16, 1914.
Secretary, Dr. O. G. Krause, Wells Bldg., Milwaukee, Wis.

National Dental Association.

The 1914 session of the National Dental Association will be held in Rochester, N. Y., July 7 to 10, 1914. The local committee has selected the Powers Hotel as headquarters and have made the other necessary arrangements for a large attendance.

This is the first meeting of the association under the reorganization and the House of Delegates, the governing body, will meet at 10:30 A. M., July 6th.

The officers and committees are expecting to present an exceptionally program, the details of which, together with the other arrangements, will appear in the later journals and the next number of our Official Bulletin.

HOMER C. BROWN, President,
Columbus, Ohio.

OTTO U. KING, General Secretary,
Huntington, Indiana.

Southern Branch — N. D. A.

The 1914 meeting of the Southern Branch of the National Dental Association will be held in Atlanta, Ga., June 4th to 6th inclusive. The local committee of arrangements have selected the Hotel Ansley as headquarters and have the other necessary arrangements made for this meeting. The officers and committees are planning to present an exceptionally interesting program, the details of which, together with the other arrangements, will be presented in later journals.

JESSE L. WILLIAMS, Cor. Secretary.
Jacksonville, Fla.

W. A. DEAN, President,
Tampa, Fla.

American Medical Association Section of Stomatology.

The annual meeting of the American Medical Association will be held at Atlantic City, June 22 to 26, 1914.

PROGRAM FOR THE SECTION OF STOMATOLOGY.

TUESDAY 2:00 P. M.

1. Chairman's Address.....Dr. William C. Fisher, New York
2. Mesothelial Tumors of the Jaw....Dr. Robert H. Ivy, Philadelphia
   Discusser: Dr. Robert P. Bay, Baltimore.
3. Cystic Tumors of the Jaw.....Dr. Gorden New, Rochester
4. Differential Diagnosis of Major Mouth Lesions,
   Dr. Stewart L. McCurdy, Pittsburg
5. The Methods of Obtaining Dental Service in Hospitals by the Appointment of Internes.....Dr. Herbert L. Wheeler, New York

WEDNESDAY 2:00 P. M.

6. What Shall be the Content for a Course in Oral Surgery in Our Dental Schools.....Dr. A. H. Levings, Milwaukee, Wis

DISCUSSERS:

a. Dr. Geo. V. I. Brown.....Milwaukee
b. " Thomas Gilmer .....Chicago
c. " F. B. Moorehead .....Chicago
d. " M. I. Schamberg.....New York City
e. " J. A. Pettit.....Portland, Ore.
f. " Vilray P. Blair.....St. Louis
g. " M. H. Cryer.....Philadelphia
h. " James G. Sharpe.....San Francisco

THURSDAY 9:30 A. M.

7. The Scientific Routine of Tooth Brushing and Mouth Cleaning .....Dr. Joseph Head, Philadelphia
8. Osteoplastic Surgery of the Face....Dr. Wayne W. Babcock, Phila
9. Fractures of the Inferior Maxilla..Dr. Henry S. Dunning, N. Y. C.
10. Bacteriology of Alveolar Abscess.....Dr. Thomas Gilmer, Chicago
11. Acute Parenchymatous Glossitis.....Dr. Virgil Loeb, St. Louis
12. The Section of Stomatology as a Factor in the Evolution of Dental and Medical Science...Dr. Geo. V. I. Brown, Milwaukee

THURSDAY 2:00 P. M.

13. Mouth Infection as a Source of Systemic Disease, Dr. Frank Billings, Chicago

DISCUSSERS:

a. Dr. Edward C. Rosenow.....Chicago
b. " Charles H. Mayo.....Rochester
c. " Victor C. Vaughn.....Ann Arbor, Mich.
d. " Charles L. Mix.....Chicago
e. " Daniel H. Squire.....Buffalo

e. (The Peridental Membrane as a Source of Infection.)
f. Dr. C. B. Craig.....New York
f. (Mouth Infection in Relation to Nervous Affection.)

We are exceptionally fortunate in having on the program of this meeting the gentlemen whose original work has correlated certain systematic diseases with mouth infections.

An effort will be made to harmonize the different methods of teaching oral surgery in our dental schools, and to formulate a comprehensive scheme for a uniform course of instruction.

A very attractive program is here offered and those who are interested are cordially invited to be present and take part in the discussions.

EUGENE S. TALBOT, Secretary.

VIIth. International Dental Congress. (London.)

Section X: Dental Education.

The subjects for report to be followed by discussion are:

(1) "The Teaching of Bacteriology for Dental Students," "Methods of Teaching," "Extent of Teaching." Reporters—Mr. J. Howard Mummery and —— ——————.

(2) "A Practical Synopsis of Medical and Surgical Teaching for Dental Students." Reporter—Dr. Godon.

(3) "First Principles in Practical Teaching." Reporter—Dr. Gaddes.

(4) "Methods of Teaching Orthodontics to Dental Students." Reporters—Dr. Guilford and Dr. Martinier.

The mornings of the 5th, 6th and 7th of August to be devoted to reports and the afternoons to independent papers.

The committee of the section is desirous of obtaining names of gentlemen willing either to discuss the above subjects, or to read papers on "Dental Education."

F. Bocquet Bull,
Guy's Hospital, London, E. C.,
George Sheppard,
59 Merrion Square, Dublin,
Honorary Secretaries.

Northern Ohio Dental Association.

The fifty-seventh annual session of the Northern Ohio Dental Association will be held at the Wigmore Coliseum, Cleveland, Ohio, Thursday, Friday and Saturday, June 4, 5 and 6, 1914.

C. D. Peck, Secretary.
Graham Building, Sandusky, Ohio.

Georgia State Dental Society.

The forty-seventh annual meeting of the Georgia State Dental Society will convene at the Ansley Hotel, Atlanta, Ga., June 4, 5 and 6, 1914, beginning Thursday, June 4th at 10:00 A. M.

The Southern Branch of the National Dental Association will meet in connection with the Georgia State Society, and excellent papers will be read and clinics given.

All ethical practitioners are extended a cordial invitation. Any further information cheerfully furnished by the secretary.

Dr. M. M. Forbes, Secretary.
303-4 Candler Building, Atlanta, Ga.

Massachusetts Board of Registration in Dentistry.

A meeting of the Massachusetts Board of Registration in Dentistry will be held in Boston, Mass., June 3, 4 and 5, 1914. For applications and other information apply to

Dr. G. E. Mitchell, Secretary.
14 Water Street, Haverhill, Mass.

Southern California Dental Association.

The seventeenth annual session will be held June 29th, 30th, and July 1st and 2d, in the Yosemite Valley, in conjunction with the California State Dental Association.

This joint meeting is planned by the officers of the two associations to afford an opportunity for the members to become better acquainted with one another, and as a get-together meeting in the interest of the great Panama-Pacific Dental Congress, to be held in San Francisco, August 30, 1915.

An excellent program of papers, clinics and exhibits is being prepared, but "shop" will be so regulated as not to interfere with the social, sight-seeing and general vacation features that the environment of the Yosemite Valley offer.

Montana State Dental Society.

The Montana State Dental Society will meet in Great Falls, Montana, June 11, 12 and 13, 1914.

F. W. ADAMS, Secretary.

Billings, Montana.

North Carolina State Board of Dental Examiners.

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at Hendersonville, N. C. Beginning promptly at 9:00 A. M. on Monday, June 22, 1914. All applications must be in the hands of the secretary not later than June 15th. For further information and application blanks address the secretary.

DR. F. L. HUNT, Secretary.

Asheville, N. C.

Arkansas State Board of Dental Examiners.

The next meeting of the Arkansas State Board of Dental Examiners will be held at the Marion Hotel, in Little Rock, Ark., on June 8th and 9th.

Application and fees should be filed at least ten days prior to date set for examination.

For future particulars address

I. M. STERNBERG, D.D.S., Secretary.

Merchants National Bank Building,

Fort Smith, Ark.

The Florida State Dental Society.

The Florida State Dental Society will hold its annual meeting at Atlantic Beach Hotel, Atlantic Beach, Fla., July 1st, 2d and 3d.

All ethical dentists are invited to attend. Any other information will be gladly furnished by

ALICE P. BUTLER, Cor. Secretary.

Gainesville, Fla.

Iowa State Board of Dental Examiners.

The next meeting of the Iowa State Board of Dental Examiners for the examination of candidates will be held at Iowa City, commencing at 9:00 A. M., June 1, 1914. For application blanks and particulars write

J. A. WEST, Secretary.

417 Utica Building, Des Moines, Ia.

Vermont State Board of Dental Examiners.

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, June 29, 1914, continuing three days, commencing at 2 o'clock P. M., June 29th.

To be eligible for examination a candidate must first be twenty-one years of age; second, must be a graduate of a high school of the first class; third, must be a graduate of a reputable dental college.

Applications must be in the hands of the secretary not later than June 20th. For further information apply to

GEORGE F. CHENEY, Secretary.

St. Johnsbury, Vt.

Illinois State Board of Dental Examiners.

The semi-annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the State of Illinois, will be held at the Northwestern Dental School, 31 West Lake Street, Chicago, Ill., beginning Thursday, June 11, 1914, at 9 A. M. All applications, together with fees, twenty-six dollars ($26) must be filed with the secretary at least five (5) days prior to date of examination.

Address all communications to

O. H. SEIFERT, Secretary.

305-6-7-8 Ridgely Bank Bldg., Springfield, Ill.

National Association of Dental Examiners.

The thirty-second annual session of the National Association of Dental Examiners will be held at the Rochester Hotel, Rochester, N. Y., beginning July 6th at 10 A. M. and continuing until adjournment.

Every State Board holding membership in the association is earnestly requested to have at least one representative present at this session. Members of all State Boards are invited.

Hotel reservations should be made immediately, as the National Dental Association meets in Rochester during the week beginning July 6th, and the attendance undoubtedly will be large.

T. A. Broadbent, Secretary,
15 E. Washington Street, Chicago, Ill.

A. E. Honey, President,
Kalamazoo, Mich.

Florida State Board of Dental Examiners.

The Florida State Board of Dental Examiners will meet June 26, 27, 29 and 30, 1914, in Jacksonville.

All applicants must come prepared to put in one gold and one amalgam filling in the mouth, make one post crown, and set up upper and lower set of teeth on anatomical articulator.

Articulators, models, blowpipes and gas appliances furnished by the board.

Applicants must exhibit diplomas from reputable dental schools. Secretary would like to meet all applicants at the Seminole Hotel at eight o'clock on the evening of June 25, 1914. Fee $25.

W. G. Mason, Secretary.

Tampa, Fla.

Board of Dental Examiners of Alabama.

The Board of Dental Examiners of Alabama will meet at Selma, Ala., on the morning of June 2, 1914.

Examinations will be both theoretical and practical. All theoretical examinations must be in writing.

Applicants must be twenty-one years of age, of good moral character, and must present to the board diploma or satisfactory evidence that he or she has graduated in dentistry at some college of dentistry recognized by National Association of Dental Faculties.

W. J. Reynolds, Secretary.

Parrish Building, Selma, Ala.

Dental Commissioners of Connecticut.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford on Thursday, Friday and Saturday, June 18, 19 and 20, 1914, to examine applicants for license to practice dentistry. Application blanks, rules, etc., will be forwarded by the recorder on request.

By order of the Commission.

EDWARD EBERLE, Recorder.

902 Main Street, Hartford, Conn.

Indiana State Board of Dental Examiners.

The next regular meeting of the Indiana State Board of Dental Examiners will be held in the State House, at Indianapolis, beginning June 15th and continuing five days. For further information and blanks, address

F. R. HENSHAW, Secretary.

507 Pythian Building, Indianapolis, Ind.

Reading Dental Society.

The entire membership of the Reading Dental Society joins the National Body.

At the April meeting of the Reading Dental Society it was moved and carried that the Reading Dental Society give expression of its faith in, and support of, the work of the National Association by joining that body with its entire membership.

The secretary was instructed to forward a check of $38 to the National Association as our dues for the year 1914.

Believing the above information will be helpful to the cause, we submit the same for publication in your journal.

Signed,

GEO. F. DELONG,
C. R. SCHOLL,
Press Committee of the Reading Dental Society.

CHAS. C. NOBLE,
WELLSLAKE D. MORSE,
W. W. MCCOLLUM,
Publicity Committee.